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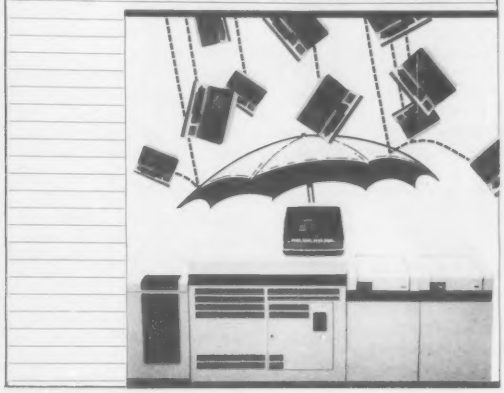
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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CIAL REPORT

Inside — Weathering the Micro Storm



Top-End, 32-Bit Mini Caps Honeywell DPS 6 Family

By Ed Scannell
CW Staff

WALTHAM, Mass. — Honeywell, Inc. last week unwrapped its most powerful 32-bit system to date, as well as two 16-bit systems that can be field upgraded to 32-bit levels. The system introductions completed a realignment of the firm's DPS 6 family of minicomputers begun earlier this year.

Intended to replace existing mid- and upper-range DPS 6 systems, the 32-bit DPS 6/95 and 16-bit DPS 6/45 and 6/75, like the microsystems 6/10, 6/20 and DPS 6/40, all run the company's Gcos operating system. Honeywell contended that this marks the first time a major vendor has allowed systems ranging from desktops to superminis to use the same software without making any modifications.

Honeywell also announced:

- Price reductions on its DPS 6 64K-byte memory expansions from $12,000 per 1M byte to $9,000. Reductions were also made on the firm's 256K-byte packs from $3,000 to $2,000 and its 256M-byte storage units from $33,000 to $25,000.
- Two high-speed, DPS 6-, 7- and 8-compatible line printers that print at 1,200 and 900 line/min, respectively.
- Enhancements to its Totalcare customer service program, including the Remote Support Facility that allows users to monitor their own remote systems (see story Page 4).

At $80,000, the basic version of the top-of-the-line 6/95 costs $40,000 less than the previous high-end machine, a spokesman said. This ver-

(Continued on Page 4)

Custom, Prewritten Software Different

Taxable Software Decision Upheld

By Bill Laberis
CW Staff

DETROIT — In an apparent victory for users and vendors of mainframe software, the Michigan Supreme Court has upheld a state appeals court decision differentiating between custom and prewritten software for sales tax purposes.

The high court's summary judgment verified the lower court ruling, stating, essentially, that software programs requiring periodic maintenance, updating and documentation are intangible and, thus, not subject to state sales taxes.

"Customized computer software programs should be distinguished from canned software programs, TV games, albums and cassette tapes, because the latter are all end products themselves," the court ruled. "The focus of the instant transaction is on the personalized service of the software vendor — an intangible transaction."

For the most part, state sales taxes apply only to those items considered tangible. The tax, where it applies

(Continued on Page 8)

IBM's 4381, 4361 Slam Window on PCM Mart

By Ed Scannell
CW Staff

IBM's recent introduction of its 4381 and 4361 mainframes slammed the last marketing window on the fingers of the plug-compatible manufacturers while greatly improving its competitive position against 32-bit mini makers, industry watchers believe.

Analysis

The 4381, code-named "Glendale," fills the price/performance gap between the company's 4341 Model Group 12 and 3083 Model Group E mainframes that PCMs have been walking through the past couple of years.

But with the 4381 — the first low-cost MVS/XA-compatible system that processes between 2 and 2.4 million instructions per second in commercial applications and between 2.5 and 3 Mips in scientific applications — PCMs will be scrambling over the next few months to cut prices, boost performance or put MVS/XA up on their machines, analysts say.

IBM's strategy with the 4381, some analysts contended, is to provide an attrac-

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Inside

Europe on a dollar a day? Maybe not, but a Swedish company is offering California firms the chance to cut time-sharing costs by as much as 50% by buying time on computers located just outside Stockholm rather than in the U.S. **Page 10.**

• • •

Hewlett-Packard Co. has thrown a competitive punch at IBM by offering a system that costs slightly less than the Personal Computer and boasts a touch-activated display screen. **Page 9.**

• • •

Debate on the safety of video display terminals could heat up following the ratification of a first-of-its-kind contract by an office workers' union at a Boston college, acknowledging past reports of problems encountered by pregnant women who use these devices. **Page 2.**

• • •

The DP industry may not have gone Hollywood yet, but a number of firms have turned to familiar prime-time TV and sports figures to peddle their products to a star-struck public. **Page 48.**

• • •

Northern Telecom, Inc. has unveiled a series of products aimed at increasing the data handling capabilities of its SL-1 digital private branch exchange. **Page 79.**

• • •

Sharing secrets on protecting trade secrets has become a necessary strategy for firms in California's highly competitive Silicon Valley. **Page 101.**

• • •

Cullinet Pact To Create Tie With Apple At Standstill

By Katherine Hafner
CW Staff

BOSTON — Just one day after Cullinet Software, Inc.'s annual meeting earlier this month, the software company and Apple Computer, Inc. all but scrapped an agreement to develop jointly a software interface providing Apple's Lisa computer with access to mainframe data.

Viewed by industry analysts as a major endorsement of the Lisa as a viable part of IBM mainframe environments, the agreement to link the personal computer to mainframe-based corporate data bases through Cullinet's Information Database was announced April 19 in a flurry of enthusiasm. Six months later, in the wake of disagreements over marketing and development strategies, the deal appears to be at a mutually agreed upon standstill.

"From the very beginning, it was perceived as a very good deal for Apple, because it got it into the IBM mainframe environment, where it would otherwise have difficulty going," Robert Goldman, Cullinet's president, commented. "For Cullinet, it really had no impact, at least in the short term."

While stressing that Cullinet has not "closed any doors or pulled up the bridge" on its relationship with Apple, Goldman said the fundamental problem with the agreement lay in "a basic misunderstanding . . . as to who would do what" in the development, marketing and support of the interface

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Possible Precedent Set

Union Contract Targets VDT Users

By Lynn Haber
CW Staff

BOSTON — In a precedent-setting move, a union representing office workers at a university here has ratified a contract that acknowledges reports of problems encountered by pregnant women who use video display terminals (VDT) and offers work alternatives. The contract is believed to be the first of its kind in the country.

In its 1983-85 contract, District 65, United Auto Workers Union, which represents clerical workers at Boston University (BU), seeks to protect pregnant VDT workers by specifying certain options that give them the choice of transferring from VDT-related tasks to work that does not require the use of a VDT.

According to Sue Parsons, chairwoman at the BU Local District 65, approximately 60% of the clerical workers at the university use VDTs.

Paragraphs 1 and 2 of Section 2 covering VDTs under Article 18 on Health and Safety of the new contract reads as follows:

"● The university will make every reasonable effort to ensure that workstation designs are appropriate for VDT use. Toward this end, the university will provide all departments using VDTs with a set of advisory guidelines on their appropriate installation and utilization.

"● Although research to date has not proven that VDTs are a health or safety hazard, in recognition of employee concern about the potential adverse effets involving pregnancy, the university agrees to the following: Upon request, the university will attempt to reassign a pregnant employee to work which does not require the use of a VDT. If such reassignment is not practicable, the employee, upon request, may be granted a Personal Leave up to three months under Article 39, which shall be in addition to any other leave under Article 39 for which she may be eligible."

First VDT Language

Organized with District 65 since April 1979, clerical workers at BU first incorporated VDT-specific language into their 1981-83 contract. This language was concerned with eye protection for VDT users and encouraged yearly eye examinations.

Since the previous contract, increased public information regarding the potential health risks associated with VDT use, some of which include eye and vision problems, back, neck and shoulder fatigue, job stress and pregnancy problems, has spurred the union's members to take action.

"The more research that came out, the more agitated people were becoming," Parsons said. "The final reaction was to include language in the contract to protect workers from potential health risks associated with VDT use."

The union's contract victory is the result of "long and hard work by the union's Health and Safety Committee," Parsons said. The committee surveyed employees, conducted research, met with management and issued its own guidelines before negotiating the new contract language.

According to Jenny Hochstadt, a union local officer for health and welfare, health complaints associated with VDT use were not uncommon.

"In overall complaints, we had a zillion," Hochstadt said. "The majority of these complaints had to do with headaches, eyesight and numbness in a user's hands."

The gravest VDT-related health problem at BU was a pregnancy statistical cluster report from the Information Services Office. Over the past 3½ years, five out of five pregnancies of workers at that office were problem pregnancies. According to Hochstadt, the Information Services Office has a history of being the department at the university where VDTs were installed and used for the longest period of time.

According to information from Boston's 9 to 5 organization for women office workers, since July 1980 women VDT operators in eight work places across the country have reported extremely high rates of miscarriages and birth defects.

The inclusion of VDT-specific language in the recently ratified union contract between District 65 and BU is probably just the tip of the iceberg in the controversial arena where some groups want to regulate VDT use in the work environment and others stand by the claim that no scientific studies to date attribute permanent health defects to VDT use.

Statistics indicate that between seven million and 10 million VDTs are presently in use across the nation, and office automation in the U.S. is growing steadily.

Efforts to regulate VDT use have been seen in the state legislatures as well as in the unions. VDT bills have surfaced in six states including Massachusetts, Connecticut, Illinois, Maine, Oregon and New York, but as yet none have been passed into law.

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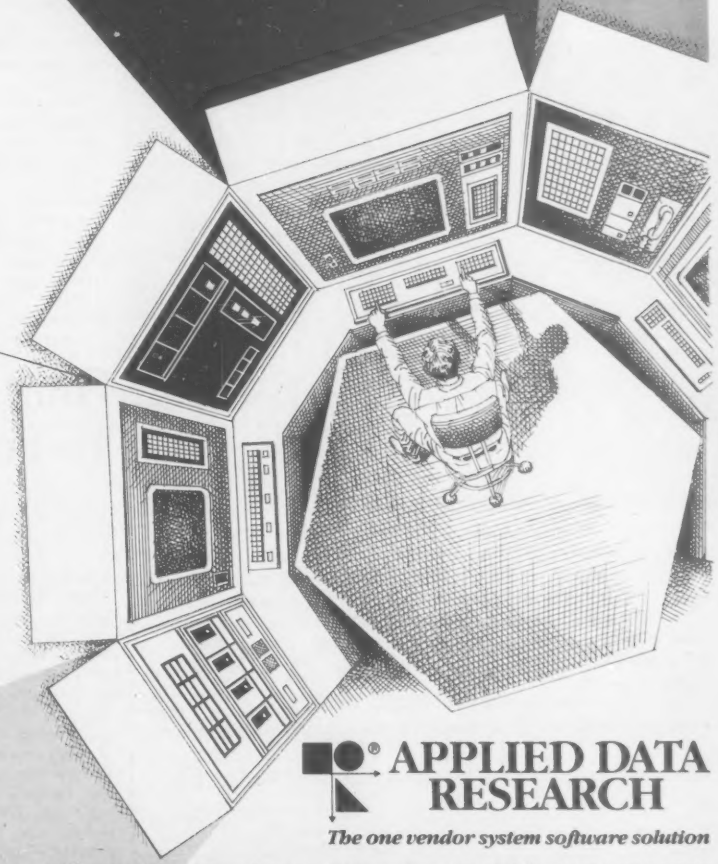
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Honeywell Caps Realignment of DPS 6 Line

(Continued from Page 1)

sion includes 2M bytes of main memory, expandable to 16M bytes, and three processors — a central processor, commercial instruction processor (CIP) and scientific instruction processor (SIP) — all linked through 32-bit data paths. The basic configuration also includes a high-speed cache memory.

Fully configured, the 6/95 can support as many as 128 communications lines. Equipped with a new disk controller, it also supports up to three disks in seek mode while reading and writing on a fourth, the company said.

Carrying a $20,000 price tag, the bare-bones version of the DPS 6/45 is built around the vendor's Micro 6 microprocessor, has 1M byte of internal memory, expandable to 2M bytes, and, like the 6/95, has the CIP. The basic system also features the firm's multiple device controller (MDC-III), with a panel-mounted 5¼-in. diskette and a communications controller that supports four communications lines.

Users wishing to expand the 6/45's basic configuration can tack on up to four 40M-byte subsystems or four 67M-, 80M- or 256M-byte storage devices. By adding a second controller, the spokesman noted, users can double the system's on-line mass storage, permitting it to support eight storage devices holding 2G bytes of information.

The DPS 6/75's unadorned configuration includes the central processor and CIP, 1M byte of main memory, a memory cache, a multiline communications controller and MDC-III controller. This version lists for $35,000, exactly half the cost of the company's previous comparable model.

To upgrade the 6/75, users can optionally add an SIP, another 1M byte of memory and up to 96 communications lines, a spokesman noted.

The 1,200 line/min PRU9620 and the 900 line/min PRU9619 impact line printers both print 136 columns and feature the electronic vertical format unit, which stores user-programmed vertical print formats received from the host system. While the printers are printing, a spokesman explained, software accesses the various formats as required by the user.

Cost of the PRU9619 is $26,000 and has an annual maintenance fee of $2,150, while the PRU9620 sells for $33,000 and costs $2,900 a year to maintain.

The three DPS computers and the two line printers are available from Honeywell, 200 Smith St., Waltham, Mass. 02154.

HONEYWELL, INC.

Characteristics \ System	DPS 6/96	DPS 6/95
Relative Performance[1]	38	—
Mips[2]	.62	Not Available
Memory Size in Bytes (Minimum-Maximum)	1M-16M	2M-16M
Purchase Price[3] (Memory Size)	$392,146 (16M)	$194,000 (16M)
Lease Price (Lease Term)	None	None
Machine Cycle Time (Nsec)	300	300
Channels (Minimum-Maximum)	2-112	4-128
Cache (Buffer) Size	8K	8K
Bus Architecture?	Yes	Yes
Price per 1M Byte Of Main Memory	$10,000	$9,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, console and 80M bytes of disk storage.

Totalcare Customer Service Enhanced by Honeywell

WALTHAM, Mass. — Honeywell, Inc. enhanced its Totalcare customer service program last week with a facility that allows its customers to monitor their own remote systems for software and hardware problems and provides users with error detection and operator assistance.

The Remote Support Facility (RSF) is a standard internal component in all three DPS 6 minicomputers unwrapped by Honeywell last week that allows users greater flexibility in maintaining their systems, the company said.

The RSF also allows Honeywell's Technical Assistance Center (with a user's permission) to take over remote control and operation of a user's system for diagnosis, a spokesman said.

Another enhancement to the Totalcare program is the Remote Support Update Facility, which permits users to update their application programs remotely and also to receive software patches.

Other customer service improvements added to the program include a four-hour and optional two-hour response time on service calls and a 90-day warranty covering both parts and labor. Also, the company said it has reduced its second-shift maintenance charges and eliminated the surcharge on service calls to sites located more than 50 miles from a Honeywell service center.

According to Sy Kraut, vice-president and general manager of Honeywell's Customer Services Division, the added enhancements will improve the availability of the systems to users by making use of the DPS 6 systems' integrated diagnostic abilities.

Another benefit is that customers will also have quicker access to spare parts under the firm's Customer Assisted Maintenance Program. Users subscribing to this program, for example, can request delivery of spare units within four hours if they are located less than 50 miles from an authorized stocking distributor, a spokesman explained.

Four AT&T Digital Services To Be Marketed as Accunet

BEDMINSTER, N.J. — AT&T Communications has announced that four of its digital transmission services will now be marketed as Accunet Digital Services.

Accunet Reserved 1.5 (or 3.0) Service — formerly High Speed Switched Digital Service (HSSDS) — operates at either 1.5M or 3M bit/sec and provides two-way transmission of any signal that can be digitally encoded.

Customers can reserve facilities for applications such as video conferencing, voice, low- and high-speed data, facsimile, graphics and electronic mail. The service can use both satellite and terrestrial circuits, a spokesman said.

Accunet T1.5 — formerly High Capacity Terrestrial Digital Service — can handle the same kind of information as Reserved 1.5 Service and transmits at the same speed, but is a full-time service and operates exclusively over terrestrial facilities.

Switch Bundles

Accunet Packet Service — formerly Basic Packet Switching Service — can switch bundles or packets of data among dispersed customers' computers and computer terminals at either 9.6K or 56K bit/sec, a spokesman said.

Also added to the Accunet family is Dataphone Digital Service, which provides line digital transmission between two or more locations.

Using this service, customers can send data in two directions simultaneously at speeds of 2.4K, 4.8K, 9.6K and 56K bit/sec, according to the Honeywell spokesman.

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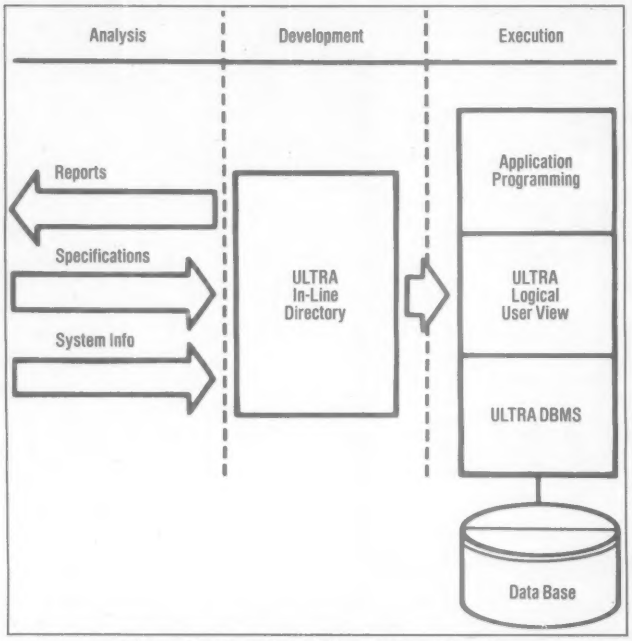
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Cincom Systems' Ultra DBMS Out for VAX-11

CINCINNATI — Cincom Systems, Inc. has announced a relational data base management system (DBMS) that runs on Digital Equipment Corp. VAX-11 superminicomputers and was designed for high-volume single processor or multiprocessor production applications. Called Ultra, the product is also said to include backup and recovery features that offer nearly nonstop operation.

Ultra's Logical User View (LUV) provides a relational view without requiring knowledge of underlying data structures, a spokesman said. All data base navigation is stored in Ultra's In-Line Directory, requiring the use of four commands to create applications. LUV is also said to provide data structure independence to insulate applications from changes to the data base.



Cincom Systems, Inc.'s Ultra In-Line Directory

The In-Line Directory provides a single, nonredundant control point for all data. When changes occur, it automatically performs the maintenance necessary to ensure accuracy of data, the spokesman said. It is active during every phase of an application, including execution. All system transactions are monitored and controlled by the directory.

The DBMS uses multitasking techniques and native mode addressing to provide support for numerous applications running concurrently. Two features are said to provide nearly full-time processing. A virtual accessing method feature is said to meet 80% of all data requirements in memory rather than storage. Task-Level Recovery recovers transaction-oriented data on task bases.

Ultra includes an Intelligent Query and Reporter, an end-user-oriented fourth-generation support tool for ad hoc requests and reports. In addition to reporting, Intelligent Query performs mathematical problems and performs on-line sorting, the spokesman said.

Ultra is available immediately at the following prices per CPU: $49,400 on the VAX-11/730; $64,900 on the 11/750; and $74,900 on the 11/780-782. Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

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Cullinet, Apple Halt Plan To Co-Develop Interface

(Continued from Page 1)

product that ran on the Lisa.

"Our feeling was that we would sell the information data base on the mainframe, and we would work with Apple to help it build the software to connect the Lisa," Goldman said, "but all the software on the Lisa would be sold by Apple. We didn't really want to get into that market."

Fielding questions at the Sept. 15 meeting (see story on Page 112), Cullinet Chairman John Cullinane made it clear that Cullinet's stake in the agreement was minimal and that his company was rapidly losing interest. Cullinane indicated that Apple was hedging and did not seem to realize the tremendous benefits to be accrued from such a deal. "If they don't do it, we don't care," he said flatly.

Although Cullinet cited the marketing disagreement as a fundamental difference that engendered the break, Apple saw the status of the agreement somewhat differently.

According to Floyd Kvamme, Apple's executive vice-president of marketing and sales, the agreement has simply been put on the back burner.

"There have been differences on exactly who would do what, but nothing has been canceled, nothing was even signed. It was an agreement to work together," Goldman said.

"We still hope to do it someday," Kvamme said. Once Cullinet develops the capability for the Lisa-mainframe interface, he added, Apple intends to pursue the joint venture.

At the core of the problem may lie a philosophical difference toward integrating personal computers into the mainframe environment.

While conceding that Apple acknowledges the importance of providing micros with access to mainframes, Kvamme said that "fundamentally, Apple is in the personal productivity business.

"The reason I was attracted to the whole Cullinet thing was it was trying to get people access only to the data they really need and want, which made its Information Database a very exciting product," Kvamme said.

In spite of the IBM Personal Computer's clear stronghold on the corporate work place, Kvamme said Apple is "fully prepared to compete with the IBM [Personal Computer] from a user-friendly standpoint. We feel we have the better unit for the individual."

Apple Cuts Cost Of Lisa by $2,000

CUPERTINO, Calif. — Apple Computer, Inc. last week sliced about $2,000 off the purchase price of its top-of-the-line Lisa microcomputer and unbundled six key software packages developed for the system.

The move brings a basic Lisa configuration into the same price range as IBM's top micro, the Personal Computer XT. Analysts agreed last week that the move is aimed at making the Lisa more attractive to large corporate users.

The Lisa hardware, including the processor, 1M byte of main memory, a 5M-byte Winchester disk drive, two 860K-byte floppy disk drives, a monitor, keyboard and cursor control mouse, now costs $6,995. A similarly configured IBM XT micro costs slightly more than $6,000, noted Joe Levy, vice-president of marketing at International Data Corp. (IDC), the Framingham, Mass.-based market research firm.

Six key application programs for the Lisa — Lisawrite, Lisacalc, Lisagraph, Lisaproject, Lisadraw and Lisalist — are now available for $1,195. The firm also announced a promotional deal that offers the six packages and an Apple dot matrix printer for $1,495. The Lisa system with the six application packages now costs $8,190. When it was introduced late last year, the system, including the six applications, cost $9,995, Apple said.

IDC's Levy said Apple cut the price of the Lisa because the units were not selling at the original $9,995 price.

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HP's Model 150 Micro Expands Disk Family

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — With the introduction of its Model 150 personal computer, Hewlett-Packard Co. (HP) last week expanded its Winchester disk systems family with two additional models and cut the prices of its 3½-in. microfloppy storage module series.

At the same time, HP also enhanced its personal computer lineup with the addition of four application software packages for word processing, spelling checking, producing financial spreadsheets and creating data files.

The latest additions to HP's family of personal computer Winchester disk systems include the 5M-byte Model 9133V and the 15M-byte Model 9133XV.

Capable of operating either alone or in combination with a 270K-byte HP 3½-in. microfloppy module, the two Winchester products mark an advance in both price and capacity over the firm's existing disk units. The 9133XV holds 50% more data than the 10M-byte system that was HP's largest Winchester disk offering for personal computer users, according to a company spokesman.

Cost Less

In addition, the 9133V and 9133XV cost up to $1,400 less than the HP Winchester disk products they replace, the spokesman said.

Occupying 12.8 in. by 11.2 in. of desk space, the 9133XV operates with both the 150 and HP's Series 200 Model 16 personal computers. The same micros also accommodate the 9133V and the 3½-in. microfloppy diskette unit, the source said.

Only the 5M-byte 9133V, however, operates with HP's Series 80 desktop systems and with the company's business-oriented Model 120 and 125 personal computers.

In other disk-related moves, HP has reportedly trimmed the price of its single- and dual-drive 3½-in. microfloppy diskette systems by 25% and 28%, respectively. The single-drive Model 9121S stores 270K bytes of formatted data, compared with 540K bytes for the dual-drive Model 9121D.

The four additions to HP's family of personal computer application software packages include:

- Perfect Writer, a word processing system that reportedly permits the concurrent editing of up to seven documents and provides a split-screen capability for displaying two of the seven simultaneously.
- Perfect Speller, which contains a 50,000-word dictionary for checking spelling.
- Perfect Calc, which supports up to seven concurrent spreadsheets, with any two viewable at the same time.
- Perfect Filer, which aids in the creation of customized data files and provides a forms capability for entering and displaying those files.

The 9133V and 9133XV Winchester disk units, coupled with a 3½-in. microfloppy module, cost $3,040 and $3,650, respectively. In the wake of the recent price cuts, the single-drive 3½-in. microfloppy now costs $900, compared with $1,270 for its dual-drive counterpart. When ordered as a package with the 150, the four additional Perfect Software programs cost $995.

More information about HP's price cuts and enhancements can be obtained from the firm's local sales offices. HP is located at 3000 Hanover St., Palo Alto, Calif. 94304.

Michigan Court Upholds Taxable Software Distinction

(Continued from Page 1)

to software, is ultimately passed on to end users.

The Michigan ruling — the third state high court decision on software sales taxes in the past two months [CW, Aug. 22] — could have an impact on similar court cases pending in other states, where users have challenged the practice of taxing custom software. In this regard, the Michigan ruling was termed "extremely significant" by some of those who have battled various state treasury departments for sales tax exemption of custom software.

"The only way to win these cases is to show that we, the custom software vendors, are dealing with people and not machines," said Robert M. Sherin, president of Southern Computing Services, Inc. of Miami and a key witness in the Michigan case. "I believe this same case can be argued correctly in most any state and won. . . . This ruling is just spectacular."

Butted Heads

Sherin, who has butted heads with state tax authorities over the software exemption since 1976, said the services supplied by custom software vendors are comparable to the work of lawyers and accountants, whose services are not taxed.

"We want equal rights with those professionals," Sherin said. "The question of tangibility or intangibility in custom software is mitigated by our personal service."

Ron Palenski, assistant general counsel for the Association of Data Processing Service Organizations, Inc., said he believes the Michigan ruling represents the first time a state high court has upheld a ruling differentiating between custom and unmodified prewritten software. "This is a distinction that will become more important in other cases," Palenski said.

As Palenski noted, the current year has been marked by a flurry of activity in state legislatures and courtrooms relating to software sales taxes. Prior to 1983, only four states had laws and regulations pertaining to software tangibility. That number has increased to 45, and the number of instances in which the rules are being contested has also increased.

Recent high court rulings in Vermont and Maryland stipulated that sales taxes apply to most prewritten programs, exempting some custom software [CW, Aug. 22]. And in Virginia this month, the state attorney general ruled that municipalities there can tax all computer software as personal property.

Attempts to tax software are directly related to austerity programs at the federal government level. "The federal government has cut financial aid to the states, who see the computer industry as a growing source of future [state] revenues," Palenski said. "The states are plainly divided as to how to apply sales tax laws, however."

Further, as Palenski noted, there is a considerable disparity from state to state in attempts to define custom software definitively. This leaves application of sales tax laws as they apply to software "pretty open to question," Palenski said.

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Uses Touch-Activated Display

Model 150 Puts HP Into Mainstream Micro Fray

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — Hewlett-Packard Co. last week leaped into the thick of the personal computer fray with the introduction of a business microcomputer that uses a touch-activated display screen as its main user interface.

Though hardly HP's first desktop offering for nontechnical commercial users, the Model 150 marks the company's debut in the mainstream of the burgeoning nonscientific personal computer field.

Like the IBM personal computers with which it will compete, the 150 supports Microsoft, Inc.'s MS-DOS operating system and is built around a 16-bit Intel Corp. 8088 microprocessor. But in a basic configuration, the HP machine costs over $100 less than a comparably equipped IBM system and features an accelerated version of the 8088. With the 150, the microprocessor operates at 8 MHz; with the IBM product, the same component is rated at 5 MHz, a spokesman for HP said.

Sharp Tech Departure

In technology, the 150 marks a sharp departure from the other members of HP's Series 100 personal computer family, which also includes the Models 120 and 125, both 8-bit machines supporting Digital Research, Inc.'s CP/M operating system.

Unlike its two sister products, the 150 allows users to implement commands, select menus and otherwise interact with programs merely by touching the unit's display screen. HP claims to have enhanced existing touch-screen technology by trimming its price to the point where it can be made available with the company's latest personal computer as a standard feature.

The Model 150 will also support a much wider selection of industry-standard application packages than either the 120 or 125. Among the programs that operate with the latest HP personal computer are Condor Computer Corp.'s Condor relational data base management system, Micropro International Corp.'s Wordstar word processing system and Visicorp's Visicalc financial spreadsheet facility.

All three packages have been rewritten from scratch — under license from their respective developers — to support the 150's touch-screen and soft-key features, the spokesman said.

Additional Software

Other software available with the 150 includes:

- Personal Applications Manager, a front-end program that buffers users from MS-DOS and allows them to do a variety of tasks without having to enter operating system commands.
- DSN/Link, a communications package that permits data to be exchanged between a 150 and either an HP 3000 series mainframe or other 150s.
- Personal Card File, a simplified data base facility that enables users to create and update an electronic version of a Rolodex-like card file.
- Memo Maker, a simplified, Wordstar-compatible word processing aid that allows users to type, edit and print brief business documents.
- Microsoft Basic, the standard programming language with MS-DOS.
- A graphics capability that permits users to create and print pie, bar, line and other charts without having to enter information through a keyboard.

By the end of the first quarter of 1984, HP will expand the 150's software support to include packages like Lotus Development Corp.'s Lotus 1-2-3, Ashton-Tate's Dbase II and an IBM 3278 emulation feature.

Capable of running all HP 3000 series software without modification, the 150's CPU, display terminal and optional built-in printer sit atop a dual 3½-in. floppy diskette unit that stores 270K byte/drive. Together, the hardware modules occupy about 1.7 sq ft, approximately the same amount of desk space as an open three-ring binder.

A basic 150 comes with 256K bytes of random-access memory, which expands to a maximum of 640K bytes, 10 times the capacity of HP's 120 and 125.

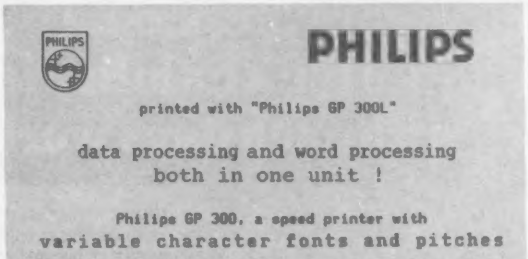
The personal computer also provides an HP interface bus port that permits the attachment of up to 15 peripherals, including optional 5M- or 15M-byte Winchester disk systems. In addition, the 150 sports a low-profile, ergonomic keyboard and incorporates two RS-232 ports, two expansion slots and 160K bytes of read-only memory for storing graphics and terminal features, the source said.

A minimum system costs $3,995, with an integrated 80-col. printer adding $500 to the price, and will become available for first customer shipments in October. More information about the 150 can be obtained from local dealers or HP sales offices. HP is located at 3000 Hanover St., Palo Alto, Calif. 94304.

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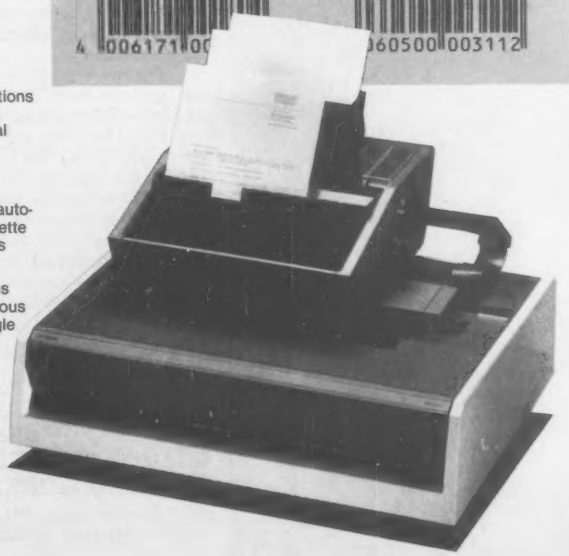
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Calif. Users Offered Access to Swedish CPUs

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — A Swedish company is offering data processing users in California time-sharing facilities on its IBM mainframes near Stockholm at prices which it claims are well below U.S. market rates.

The unique offer was announced last week here by Primdata, a subsidiary of SSAB, Sweden's largest steel company and a specialist in the area of process control, personal computers and communications.

Announcing the proposal at a reception for users, Inger Selinder, Primdata's president, said the idea is to use a combination of communications technology and time-zone differences to enable West Coast users to reap cheaper data processing services.

Noting that 8 a.m. in California is 5 p.m. in Stockholm, Selinder told his audience, "We believe that time on our side can lead to money on your side. If by taking advantage of this offer you can avoid or postpone investments in mainframes, you can save a lot of money to use in other aspects of your operations."

Under the scheme, the Swedish company, which has opened an office here, intends to make its three computer centers available between 8 a.m. and 8 p.m. Pacific Daylight Time. The main center at Oxelosund, 80 miles southeast of Stockholm, is equipped with an IBM 3033 mainframe, running under the MVS/SP 1.3 operating system and with Advanced Communication Function (ACF)/Vtam Version 2 and ACF/Network Control Program/VS communications facilities.

Other Centers

The other two data processing centers are equipped with an Amdahl Corp. 470V/7 and two IBM 4341 systems, respectively. All three centers are tied together using IBM's Systems Network Architecture, Selinder noted. All of the computer centers, the company stressed, will be manned continuously with two operators, one technician and four systems programmers, who will stand by to assist clients.

California customers will access the computers over a 9,600 bit/sec leased trans-Atlantic line or via satellite. To take advantage of the service, users will need a communications controller — IBM 3705 or equivalent — and Vtame or Vtam Version 2 software.

Security of a user's data, company officials asserted, is ensured through the use of a software package called Top Secret, manufactured by CGA Software Products Group in Vandalia, Ohio. The package is purported to be similar to IBM's Resource Access Control Facility.

Although Primdata's computers are located across the Atlantic, there is no difference between the availability of long-leased telephone lines and short ones, according to Bengt Helmerson, the firm's vice-president of operations.

In fact, availability of service at Primdata has been at 99% for the last three years, he claimed, with an average response time of seven seconds and downtime of 25 minutes when stoppages occur.

The risk of the line being unavailable, he said, is very low.

Primdata Claims 50% User Savings

SAN FRANCISCO — Primdata of Sweden claims users will be able to shave up to 50% off their computer time-sharing bills by using its computers in Sweden rather than those in the U.S. However, final costs are dependent on telecommunications charges and the amount of data being transmitted.

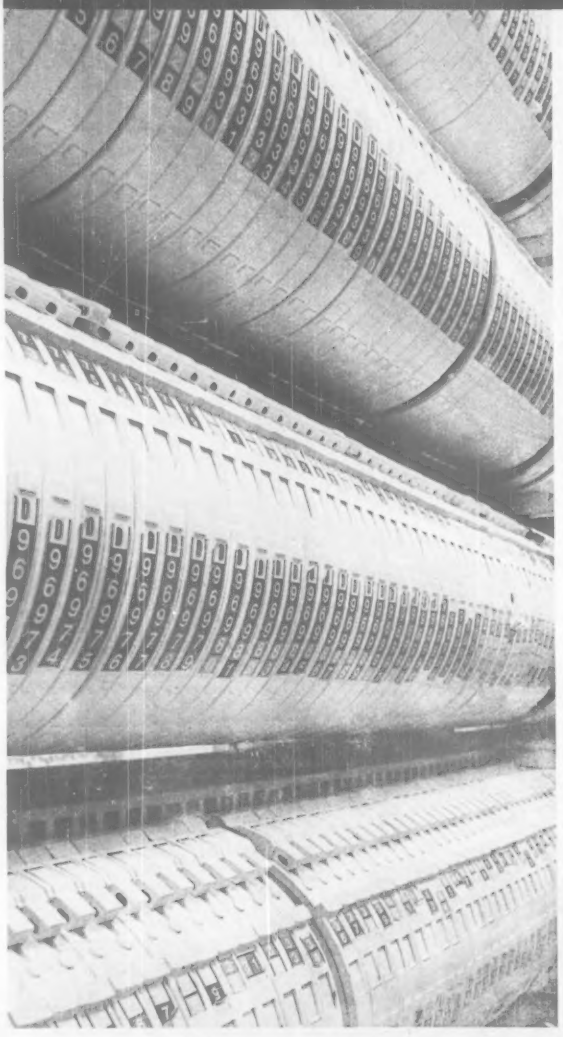
Primdata customers must pay an annual fee for a certain booked capacity on one lease line. These capacities are defined in terms of the number of terminals connected to the Primdata network, Inger Selinder, the firm's president, stated at a press conference held here last week.

Under the terms of the arrangement, the greater the number of terminals used, the cheaper the relative cost. For example, the yearly cost for using between one and 10 terminals is $33,350; for 11 to 20 terminals, the cost is $50,000 (a discount of 25%); and for 21 or more terminals, the cost is $66,700 (a discount of 50%).

Primdata intends to charge $2.70 per month for each megabyte of storage. On-line transmission costs equal $3.20 per hour of connect time and $1.80 per second of CPU time. A discount of 27% is available if yearly costs exceed $300,000 and 50% for costs in excess of $400,000.

For batch processing, the company said it will offer its services at 80 cents per second of CPU time and 60 cents per 1,000 execute channel programs. "By allowing us to do batch processing, users will have more time for special in-house services or systems development work," Selinder asserted.

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Keynoter Calls for Standardization, Cooperation

By Cheryl M. Gelb
CW Staff

PARIS — Pointing to the growing integration of computing and telecommunications, Jacques Stern, chairman of the French National Groupe Bull Co., warned attendees at the opening of the International Federation for Information Processing's Ninth World Computer Congress here last week that they must deal with three obligations:

- Standardization. Interface protection is not essential, according to Stern, who called telecommunications "the hope of the future." Without standardization, "the user may find himself trapped by his supplier and will not be able to take advantage of technological innovation."
- The development of new structures for organizations. Banks, for example, will find that "by modifying their services, they will find themselves modified."
- Cooperation. "Both those who create the technology and those who use the technology must work in concert."

This cooperation is an essential element, Stern said, because anticipation of new services "will be the essential element to ensure corporate success." He urged users to prepare themselves for new technology by anticipating it and added, "it is encouraging to see the impact of users on the design of new products."

Stern's remarks came during the keynote address that opened the triennial congress. After reviewing the progress of computing technology since the 1950s, he predicted that:

- The mean time between failures of a piece of equipment will soon equal the lifetime of that equipment.
- By 1985, 32-bit microcomputers will be common.
- Gallium arsenide will replace silicon by the end of the decade.
- Rewritable optical disks with a capacity of 10,000 pages, now in the laboratory, will soon be commercially available.
- CRT terminals will continue to be popular — especially with color — but flat-panel displays will come into generalized use.

Stern's enthusiasm came tinged with some hesitancy. "However extraordinary this progress," he said, the need for even greater progress is strong. "Needs grew as computational power increased," he said, noting that "the greater the power at our disposal, the greater the number of insoluble problems we can solve."

The essential dilemma, Stern said, is the relationship between performance and requirements. The current progress of computing, for example, will not meet the anticipated needs of industry. Although the CPUs available at the end of the '80s will be able to perform billions of floating-point operations per second (flops), that will be just sufficient.

The people who can resolve this dilemma are the researchers who are grappling with architectures capable of 10G flops. These researchers "hold in their hands the success of tomorrow," Stern said, calling for a much stronger dedication to research.

Despite the progress that may be made in hardware, however, the biggest challenge is software, which Stern said is still in a state of "prehistory" and threatens to strangle the progress of data processing.

The complexity of software today is "unbearable," Stern maintained. Issuing a clear call for simplicity, he urged the development of more generalized data base management systems and called software engineering the most pressing need.

If steps are not immediately taken to rectify the current situation, Stern said, he is afraid "that we will be creating tomorrow the software for the machines of yesterday."

CW at Ifip '83

Symposium Set For Dec. 12-13 To Cover Nets

SILVER SPRING, Md. — The Computer Networking Symposium, sponsored by the Institute of Electrical and Electronics Engineers Computer Society and the National Bureau of Standards, will be held at the Sheraton Silver Spring Hotel here Dec. 12-13.

A tutorial on computer networks will be presented by Dr. Marshall Abrams on Dec. 12. The keynote address for the symposium will be presented on Dec. 13 by J. Robert Harcharyk, vice-president, MCI Communications Corp.

There will be sessions on network protocols, network engineering, local-area networks, performance analysis, network modeling and mail and file servers.

Prior to Nov. 28, registration fees for members are: computer networks tutorial, $125; conference, $50; tutorial and conference, $175. For nonmembers, fees are: computer networks tutorial, $150; conference, $60; tutorial and conference, $200. Computer Networking Symposium may be reached through P.O. Box 639, Silver Spring, Md. 20901.

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Development of Operative Languages Urged

By Cheryl M. Gelb
CW Staff

PARIS — If we really want man-machine communication to be successful, we should forget about developing natural languages and begin instead to design "operative languages."

That stand was taken here last week by Andre Bisseret of France's prestigious National Institute of Computing and Automation Research (Institut National De Recherche en Informatique et en Automatique). Bisseret delivered a paper on psychology for man-computer cooperation in knowledge processing at the International Federation for Information Processing's Ninth World Computer Congress.

"We are still very far from computers understanding natural language," said Bisseret, who cited a number of psychological experiments to illustrate the problems faced by designers or interactive systems.

For example, "a fundamental human activity consists of categorizing objects, facts, events and so on." A person "tries to regroup objects into categories such that the objects of any given category resemble each other and differ from the objects of other categories," Bisseret said.

Scientists, however, try to "formalize the categorizing processes to obtain the most powerful tools possible" — and their results may be quite different.

Thus, Bisseret concluded later in his presentation, it is not yet possible to take results obtained in a laboratory setting and apply them to real-life situations. He proposed that language communications should be studied under the paradigm of ergonomics psychology, conducting experiments either in the field or via realistic simulations.

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The difference between general psychology and ergonomics psychology, Bisseret explained, is that in the former, the subject of an experiment has to "distinguish between true and false, whereas the latter studies the subject involved in action situations where he can either succeed or fail." Ergonomics psychology focuses on the operator.

Given the problems inherent just in studying the way man communicates and in trying to duplicate those processes by machine, "man-machine languages still have a long way to go," Bisseret maintained. Even if that goal was attained, the machine would understand language equally as well as man "and be in the same situation as man: with the same advantages, but also the same inconveniences, ambiguities and misunderstandings."

The solution, Bisseret believes, is to abandon research into natural languages and instead work on "restricted natural languages," or operative languages.

"Current observation shows that as soon as a group of people must cooperate to a precise objective, these people build, often not deliberately . . . a particular language necessary for the efficiency of their cooperation," said Bisseret, who cited the "languages" developed by surgical teams, air traffic controllers and pilots and cooks in a restaurant.

"These can be sometimes deliberately formalized in order to be systematically transmitted," he said.

If we persist with research into natural languages , Bisseret said, we will reach a point at which "the machine understands general natural language equally as well as man [and] will experience . . . the same inconveniences. Consequently, he forecast, "the machine will need to learn, even to create, operative languages."

IEEE Approves Test Standard

SILVER SPRING, Md. — The Institute of Electrical and Electronics Engineers (IEEE) Computer Society has authorized the development of a standard for software unit testing, which will be the first to specify a software engineering process.

The unit testing standard is being developed by a task group of the Software Engineering Standards Subcommittee. Membership in the group is open to all interested — IEEE membership is not required.

The current draft decomposes unit testing into seven activities:

- Identify the features to be tested.
- Plan the approach, resources and schedule.
- Design the test cases and procedures.
- Implement the design.
- Execute the test procedures.
- Check the results.
- Report the evaluation.

Plans call for the inclusion of detailed examples from commercial, scientific and real-time applications as well as guidelines for implementing the standard.

Further information is available from David Gelperin, 2425 Zealand Ave. N., Golden Valley, Minn. 55427.

DATA GENERAL INTRODUCES THE DESKTOP GENERATION.



Education, Specialized Languages Seen Key

Debate Rages Over Ways to Simplify Languages

By Paul Gillin
CW Staff

PARIS — Large-scale programming languages have become too complex and unwieldy to handle the large applications backlog, and steps must be taken to improve them. That was the consensus of three programming language experts who debated the merits of large and small programming languages at a session of the International Federation for Information Processing Conference (Ifip '83) held here last week.

However, the experts disagreed about which methods are the most appropriate to slim down overweight languages, with two arguing that changes in education were necessary, while a third said the answer lay in greater use of specialized languages.

The distinction between small and large languages is "irrelevant," declared John Barnes, research director of SPL International in the UK. Rather, a "language should do what's wanted, and it seems small programming languages fail" this criterion, he said.

Barnes argued that standardization of a few programming languages should be a top priority for the computing industry. "There are too many languages out there, and they're too easy to create," he said.

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Moreover, he said standards are generally formed after the fact, when the base of users is too large to make standards effective.

Preparation for learning large languages should begin in secondary schools, he said. For nonscientific students, "technical awareness and some lessons in Basic should be taught to make them aware of computers and get them over the fear of Big Brother," he said. For students who display scientific aptitude, "one ought to embrace a technical knowledge based, perhaps, on set theory and logic," he said. "Perhaps there should be a simple professional-style language based around Pascal. If children set out to learn in four weeks about computer hardware and software, they can do it."

Barnes' view of the importance of large languages was not shared by David May of Inmos Ltd. of the UK. "A language is an important tool of communication from programmers to others, and so it doesn't make sense for it to be complex for anyone other than programmers," he said. "We should design languages for users, not for experts."

The basic flaw of most languages is their attempt to include too many functions, May said. "If a feature is included for every specific application and is appropriate for every specific implementation, it will become very large," he stated.

"Experience is beginning to show that one can get a lot into small languages," including concurrent and sequential processing, data types and modules.

Productivity Gains

May argued that productivity gains will not be achieved by complicating languages, and that small languages usually do not need much more extension than larger ones.

"The correct approach is to design a number of simple, reliable languages with efficient implementations" that perform certain functions well, he argued. In addition, large languages need to be simplified by moving them to higher levels. "Languages should be simple and reliable and effective for different applications," he said. However, the leader of one language development group countered that "large languages are far from the ideal, but can we do much better?"

Remi Bourgonjon, of Philipps Telecommicatie Industrie in the Netherlands, said large languages are "inherently complex," but small languages "only solve small parts of the problem." Bourgonjon argued that no language can affect the complexity of the problem to be solved. As users of a small language continue to append capabilities to meet complex needs, "it soon becomes a large language," he said.

He called reliability "a function of the skills of the programmer and the environment" and not of the language. "In my opinion, all languages are about the same in this respect," Bourgonjon said. "Small languages do not make solutions easier than the larger ones, and the larger languages have better facilities for handling some kinds of functions."

Rather, he agreed with Barnes that programming education has to begin at the conceptual stage. "We should make the distinction between learning programming as a discipline and learning languages," he said. "The first precedes the second. With good programming discipline as a background, learning a language becomes a smaller problem."

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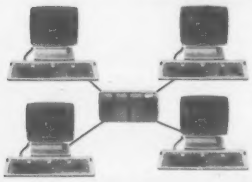
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Future of Distributed Systems Seen Clouded

By Cheryl M. Gelb
CW Staff

PARIS — A panel here last week during the International Federation for Information Processing's (Ifip) Ninth World Computer Congress brought home the point once again that the future of distributed systems is still clouded.

Dr. David Boggs of Xerox Corp.'s Palo Alto Research Center told a session on trends in distributed systems technology that the workstation/server scenario — in which end users would have individual personal computers, but share servers of expensive hardware devices, like high-quality printers — is the way to go.

But Prof. Roger Needham of Cambridge University's Computer Laboratory in the UK, while advocating the idea of servers, would provide computing power to end users via banks of processors.

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Xerox's Boggs, who worked on many of the components that today make up his firm's commercially available distributed office systems, noted that the motivation behind distributed systems is threefold: first, to make money; second, to increase the productivity of office workers; and third, to give computing power to the people.

"Within the distributed office systems area," Boggs said, "there is a need for two types of machines: workstation and server. To get fast and predictable response, workstations must be dedicated to individual users. These workstations must be low-cost, and to be cheap, they must be simple; to be simple, they must have no options, only a processor and a terminal [bit map display, keyboard and mouse], a network interface and, possibly, a disk."

According to the Boggs' scenario, the ratio of servers to workstations would be about 10:1, "so cost is not as important. What is important," he maintained, "is that it be easy to assemble many server hardware configurations."

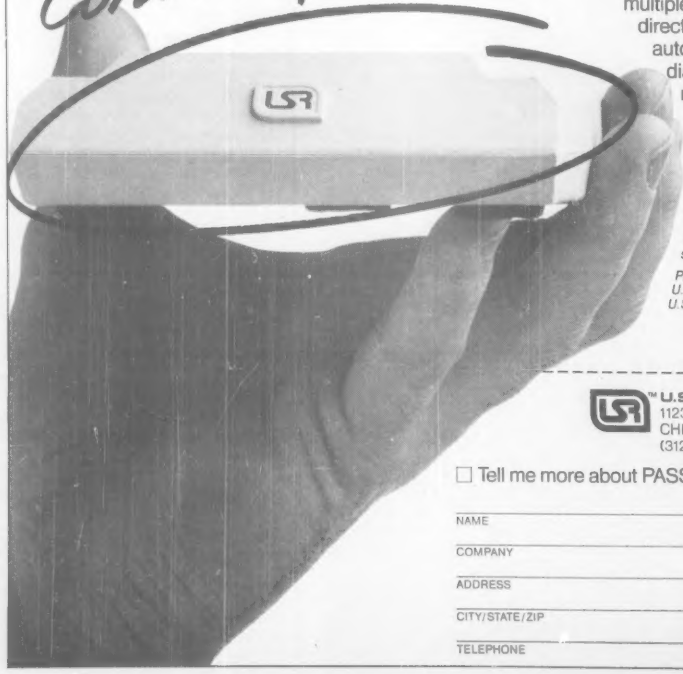
Needham agreed with Boggs' scenario, but only to a point. "Although hardware is becoming cheap, it is certainly not free, and alternative approaches should be explored." He proposed providing end users with dedicated workstations that perform "a usefully high proportion" of the users' requirements, but supplementing them with a processor bank "consisting of a number of powerful computers connected to the workstations by a suitably high-performance network."

A processor bank would give each user the most powerful machine that he might ever need, and it would provide a comfort factor because "really powerful machines are hot and noisy," he maintained.

So far, Needham said, this scenario has been tried on a model basis at Cambridge University. The processor bank consisted of 22 minicomputers, ranging in size from 128K bytes to 2M bytes, that were accessed by terminals and backed by file and tape servers. The experiment has been successful, according to Needham.

The advantages of this approach are threefold, he pointed out: It provides enhancement ease, convenient maintenance and what he termed "graceful obsolescence."

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Tech Challenges For System R Cited by Designer

By Cheryl M. Gelb
CW Staff

PARIS — One of the designers and implementers of IBM's System R distributed relational data base management system spoke optimistically here last week of such systems, but warned that four technical challenges still remain to be overcome if distributed data bases are to be truly successful.

The first challenge is to get good performance out of a distributed data base system without compromising its design, Laura M. Haas of IBM's San Jose, Calif., research facility told a session on trends in distributed systems technology. The session took place at the International Federation for Information Processing's (Ifip) Ninth World Computer Congress.

According to Haas, "The design of the distributed data base, in particular the placement, partitioning and replication of data, is very important."

The second challenge is to develop algorithms to deal with partial failures. The major technical reason for implementing a distributed data base, Haas pointed out, is that it provides users with more throughput and greater availability of data. Also, because the data base is distributed, data crashes do not affect all users. When crashes do occur, however, a way must be found to make the affected part of the system operational more quickly, she said.

The two remaining challenges are: ensuring limited access to data and finding effective and complete ways of verifying and debugging.

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System / Characteristics	4331-1	4331-2	4341-9	4341-10	4341-1	4341-11	4341-2	4341-12	4361-4	4361-5	4381-1	4381-2	3083-E
Relative Performance[1]	18	22	24	34	40	50	66	76	49	66	100	133	185
Mips[2]	.26	.38	.40	.58	.72	.88	1.1	1.2	.79	1.14	2.1	2.7	3.1
Memory Size in Bytes (Minimum-Maximum)	1M-4M	1M-4M	1M-4M	2M-4M	2M-4M	2M-8M	2M-16M	2M-16M	2M-12M	2M-12M	4M-16M	4M-16M	8M-16M
Purchase Price[3] (Memory Size)	$112,420 (1M)	$112,500 (1M)	$81,000 (1M)	$170,000 (2M)	$205,000 (4M)	$240,000 (2M)	$350,000 (4M)	$500,000 (2M)	$150,000 (2M)	$200,000 (2M)	$370,000 (4M)	$500,000 (4M)	$1,200,000 (8M)
Lease Price (Lease Term)	$5,830 (2 Year)	$6,765 (2 Year)	$5,400 (2 Year)	$8,890 (2 Year)	$8,940 (2 Year)	$1,160 (2 Year)	$14,490 (2 Year)	$21,650 (2 Year)	$2,850 (5 Year)	$3,800 (5 Year)	$7,030 (5 Year)	$9,500 (5 Year)	$37,400 (4 Year)
Machine Cycle Time (Nsec)	900 (Per 4 Bytes)	900 (Per 4 Bytes)	150-300	150-300	150-300	120-240	120-240	115-230	100 (Per 4 Bytes)	100 (Per 4 Bytes)	68 (Per 4 Bytes)	68 (Per 4 Bytes)	26
Channels (Minimum-Maximum)	0-2	0-2	3-6	3-6	3-6	6	6	6	1-4	3-6	6-12	6-12	8-16
Cache (Buffer) Size	8K	8K	2K	8K	8K	8K	16K	16K	8K	16K	8K	32K	Not Available
Bus Architecture?	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No
Price per 1M Byte Of Main Memory	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$7,500	$7,500	$10,000	$10,000	$25,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For the processor only.

IBM's 4381 Slams Marketing Window on PCMs

(Continued from Page 1)

tively priced MVS/XA-compatible system that will lure customers over to the MVS/XA environment at a faster pace. Previously, customers that wanted MVS/XA had to spend $920,000, compared with the $500,000 to $600,000 price range of the 4381.

"An XA entry at $600,000 will be a very powerful weapon against the plug compatibles. [IBM] hit them with both barrels," remarked Steve McClellan, vice-president for Salomon Brothers, Inc., a market research firm.

The compatible makers most affected by the 4381 are IPL Systems, Inc. and National Advanced Systems, Inc. (NAS), both of which do not have versions of MVS/XA running on their systems. Seeing the silver lining in the cloud, however, both companies said the 4381 will serve to boost rather than stagnate sales of their systems.

Bill Manser, vice-president of sales for IPL, is confident the Glendale announcement will encourage IPL sales to users that put off buying decisions because the 4381 was an unknown quantity. Now that they know what the 4381 looks like, they will have to make a decision one way or another. Manser feels that the advantages of the IPL systems, coupled with the shortcomings of the IBM product, will allow IPL to pick up more than its share of these users.

Technological Advantage

One of the technological advantages the IPL system has over the 4381, according to Manser, is its fault-tolerant capabilities. "Our system [4480] has advantages IBM can't offer its customers. When my system goes down, only half of it goes down; the other half keeps on running," he said.

Manser said IPL does not feel any pressure to put MVS/XA up on its system in response to the 4381, pointing out that most of IPL's customers do not need that kind of capability.

"The question I'll be posing to my customers is: 'Do you really need XA?' XA is for the big boys that have a distributed processing kind of network," Manser said. "They [IBM] did the same thing with [Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC)] in the early 1970s; they dangled it before them, telling them they have to go with SNA/SDLC. But 10 years later, less than 10% of their customers have it," he added.

While he downplayed the strategic importance of the 4381's MVS/XA compatibility, Manser also said the company plans to have an MVS/XA-compatible offering, but declined to say when such a system would be available.

Dave Goldsmith, communications manager for NAS, said IBM's entry will also boost his firm's sales because it will legitimize the market. "Everyone knew there was a gap, but people don't necessarily wait for IBM to get a gap-filler processor. Rather, what [IBM's entry] does is put IBM's stamp of approval on the fact that the gap existed and now makes all of the systems that compete in that arena credible," Goldsmith said.

The 4361 will place pressure on the 32-bit entries of Digital Equipment Corp., Data General Corp. and Prime Computer, Inc. entered in the scientific market. This marks the first time IBM has focused one of its systems specifically at the 32-bit scientific market.

Considering previous 4300 machines, which he considers to be inferior to competing machines on a price/performance basis, Frank Gens, senior analyst for The Yankee Group in Boston, said the 4361 will do well in this market.

"One of the things you have to look at is that IBM, with fairly mediocre products [earlier 4300s] still managed to become No. 2 in the [computer-aided design] market. So what can we expect once they start marketing a competitive product such as the 4361 in that arena," Gens said.

NAS Cuts Prices After 4381 Debut

MOUNTAIN VIEW, Calif. — Reacting to IBM's 4381 introduction, National Advanced Systems, Inc. (NAS) last week slashed prices by 20% on its AS/6600 series of mainframes, which compete against the 4341 and 4381.

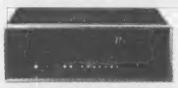
Effective immediately, the company also reduced prices on its AS/8000 and AS/9000 series by 10% to 14% in reaction to IBM 3083 price reductions.

In a prepared statement, NAS President Dave Martin said the 4381 announcement will not affect the company's ongoing goal of maintaining a 20% price/performance edge over IBM. "In fact," Martin said, "the [4381] announcement confirms the positioning of our AS/6600 series."

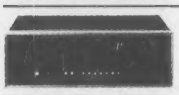
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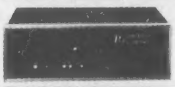
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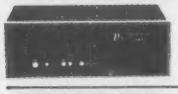
PCI 1071
A BSC to ASCII protocol converter for 3271 emulation. It's designed for companies with Bisync who want to use ASCII devices in their networks now, but may want to upgrade to SNA/SDLC later.



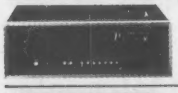
PCI 71B/SNA
A BSC 3271 to SNA/SDLC converter for 3274 emulation. It eliminates the need to buy new SNA/SDLC CRT's or controllers, thereby giving new life to Bisync investments.



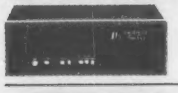
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An ASCII to Sys 34/38 protocol converter. Expanding the System 34 38 terminal network used to be an expensive proposition. Not now, with the help of the 1051.



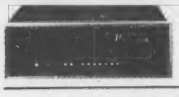
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Supercomputers Seen Gaining in Corporate Use

By Tom Henkel
CW Staff

CAMBRIDGE, Mass. — Large-scale, number-crunching computer systems will soon become as essential to business as commercial mainframe systems, according to several experts in the supercomputer arena.

Speaking at the Supercomputers Conference here sponsored by the Education Foundation of the Data Processing Management Association, the expert observers agreed supercomputers are going to take on greater importance in corporate environments as the demand grows for bigger and faster computers.

A lack of specialized software and the stigma that supercomputers are difficult to use have helped keep the multimillion-dollar number crunchers out of corporate environments, noted Dr. Sidney Fernbach, the former head of computation at Lawrence Livermore National Laboratories and currently a private consultant.

"People are scared of supercomputers because there is no easy way of getting to them," Fernbach said. Dr. Paul Schneck, assistant director for computer and information science at the National Aeronautics and Space Administration's (Nasa) Goddard Space Flight Center, supported Fernbach's contention, adding that most supercomputers in use by government agencies are "sequestered" for classified applications. With many users currently demanding more performance from commercial processors, Fernbach said the basic principles of supercomputing, such as vector processing, will have to be embodied into corporate environments to meet the demand for processing power.

Artificial intelligence software and advanced technologies, such as vision systems and computers that respond to voice commands, require massive overhead just to support the system resources, let alone added applications. Such systems will require larger, faster processors, noted Commander Ronald Ohlander, program manager of the government's Defense Advanced Research Projects Agency (Darpa) Information Processing Techniques Office.

Ohlander, however, explained that while the current term "supercomputer" generally refers to a large-scale, number-crunching processor, this type processor is only one player in the future of computing.

"The goal is to develop a system which provides intelligence to assist the user in managing large stores of information." That system, Ohlander said, will probably support a symbolic rather than numeric architecture and will be able to support artificial intelligence applications as well as complex communications networks.

Finding the skilled systems developers to create such a system may be a problem, according to another technical specialist.

"We are not producing a sufficient number of technical personnel to meet the needs of the information processing industry," noted Dr. E.F. Infante, director of the Mathematics and Computer Science Divisions of the National Science Foundation.

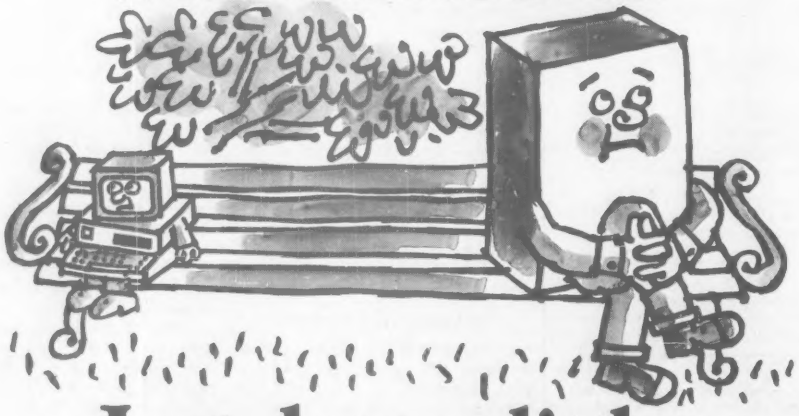
Infante noted that it is very difficult for academicians to gain access to large-scale processors, such as those of Cray Research, Inc. or Control Data Corp., because the competition is very high for the few government systems open for public research.

"Right now, the best scientists don't necessarily have access to supercomputers. Those who are successful are just more aggressive," Infante said, recommending that the government set up a referee committee to determine which academic research projects can be allowed to use government supercomputers.

He noted, however, that three universities (Colorado State University, the University of Michigan and Purdue University) have installed supercomputers for research. Unlike the government supercomputers that are 100% saturated with users, the university systems are only about 20% to 30% saturated.

This, Infante said, is because the universities charge high user fees for access to the processors. And the university supercomputer usage fees typically cannot be bundled into a regular project budget. For example, the University of Minnesota, which has a Cray 1, charges $2,000 per hour for nonprofit use and university research. It charges $3,000 per hour for all other use. When researchers have to pay "cold cash" for system resources, the desire to use them drops dramatically, Infante said.

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Book Delineates Decision Support

BETHESDA, Md. — The Urban and Regional Information Systems Association (Urisa) has published a 500-page book on decision support systems for policy and management.

The book contains 42 papers on the design and application of computerized information systems to serve public decision making.

The book costs $28, including postage and handling. Payment is required prior to shipment. Further information is available from Urisa, 4720 Montgomery Lane, Bethesda, Md. 20814.

U.S. Supercomputer Support Crucial, Committee Declares

By Tom Henkel
CW Staff

CAMBRIDGE, Mass. — If a government committee formed to study foreign threats to U.S. technological supremacy gets its way, stronger financial support for the U.S. supercomputer industry and its related disciplines, may become an official policy.

Dr. James F. Decker, chairman of that committee — the Federal Coordination Committee on Science and Engineering Technology (FCCSET) — and special assistant to the director of the Office of Energy Research at the U.S. Department of Energy, told attendees at a conference on supercomputers here last week that the government should become a "friendly buyer" of supercomputers, related high-speed peripherals and software. The conference was sponsored by the Education Foundation of the Data Processing Management Association.

The government should guarantee that it will buy supercomputer hardware and software from U.S. vendors in efforts to bolster corporate research and development projects, Decker maintained, emphasizing that the government should steer clear of manufacturing its own supercomputing gear.

The FCCSET task force recently submitted its recommendations for maintaining U.S. technological dominance, Decker said. With the 1990 goal of developing a large-scale scientific processor 200 times more powerful than current supercomputers, Decker recommended that the government significantly upgrade its plans to purchase large-scale scientific processors, even if those processors are still in the prototype stage. In addition, he said the government should consider offering research and development tax incentives to industry and be more generous in funding long-range, experimental software and hardware development projects. These steps, Decker said, will help keep the U.S. supercomputer industry healthy.

Noting that only one of the three major supercomputer manufacturers (Control Data Corp., Cray Research, Inc. and Denelcor) actually manufactures peripherals, Decker said the government must also make a strong commitment to bolster U.S. research into development of high-speed peripherals to support a 200-fold processor performance improvement.

Since most government-owned supercomputers are used for classified applications, Decker explained there have been relatively few people trained to use supercomputers, and consequently there has been little software developed specifically for large scientific number-crunching processors. To solve this problem, Decker recommended that the government attempt to make more time available on its nonclassified supercomputers to academic research and development. Decker explained this move would help develop more supercomputer applications, and it would help train more researchers in the use of supercomputers.

Lastly, Decker recommended the U.S. set up a permanent interagency group to coordinate industry and government large systems activities.

Japan's Technopark Seen Sparking High Tech Interest

TOKYO — To spark interest in science and technology, a group of Japanese scientists has mapped plans for an $800 million, Disneyland-like complex here.

To be known as Technopark, the complex will include five museums highlighting the evolution of industrial technology and will be located in a 500-acre park.

Plans for Technopark were drafted following two years of study by the Technopark Concept Study Committee of the Japan Science and Technology Foundation. Designers hope Technopark will instill an appreciation of the history of technology and help visitors envision the high technology world of tomorrow.

According to the Technopark Study Committee, developers and the local government here will cooperate with financiers and leaders in the machinery, electrical and chemical industries in the design and construction of the park. The Ministry of International Trade and Industry has expressed considerable interest in the project as a means of promoting "creative basic technology" in Japan.

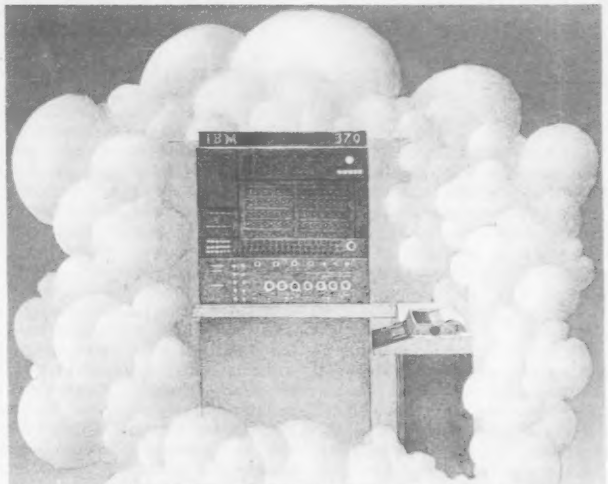
The museums, which will feature actual plants and model displays allowing visitors to get hands-on experience, will chart the growth of technology from ancient times to the present. The study committee decided upon a park format for the complex in order to promote understanding of industrial technology in a natural setting, a spokesman said.

Videotape Series Offers Training To Unix Users

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. is offering a series of videotape training courses for the Unix operating system.

The first two courses in the series — an overview of the system and a discussion of its fundamentals — consist of 21 taped instructional units and are available now. The third course, available in October, will cover the C programming language.

Future course topics include Shell programming language, advanced Unix commands and C applications. Developed by Chicago-based Telemedia, Inc., the courses can be leased for between $50 and $100 per unit from Advanced Systems at 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.



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International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

HOMEBUSH — Facom Australia Ltd., a subsidiary of Fujitsu Ltd., beat IBM, Burroughs Corp. and ICL in a bid for Arnotts Ltd. network of standardized computer mainframes. Arnotts is a large food packaging and engineering firm spanning six states here.

BRAZIL

SAO PAULO — Computer manufacturers here are not worried about the resignation of Carlos Lagoni from his position as president of the Brazilian Central Bank. The bank, under Langoni, has been controlling credit in the country to protect resident vendors and ward off foreign competition. But sources report that Brazilian businessmen have said they will resort to any upcoming credit changes or import restrictions by illegally obtaining needed equipment, smuggling and using black market money.

CHINA

BEIJING — Stimulated by the government's drive to modernize, China has installed some $500 million worth of computer equipment, purchased largely from U.S. vendors. In addition, during the first half of 1983, orders were placed for 10 IBM 4300 series mainframes and seven Hitachi Ltd. M series, valued at over $20 million. If the momentum of importing computer technology continues, industry sources here predict China will purchase $200 million worth of high-technology products this year.

BEIJING — Apple Computer, Inc.'s Apple II and Apple II+ microcomputers are gaining popularity in China. While still trailing behind Cromemco, Inc. and Radio Shack, thousands of Apples are reportedly being ordered from Apple's manufacturing plant in nearby Hong Kong.

BEIJING — Hewlett-Packard Co. plans to hold its next board meeting here in October. The meeting marks the first time an American firm has assembled for a business meeting in the People's Republic since the Communist Revolution in 1948. HP hopes the board meeting will heighten its profile in China.

FRANCE

PARIS — France's Minister of Trade and Tourism traveled to New York recently in an effort to boost France's exportation of telecommunications and electronic equipment.

Minister Edith Cresson lead a delegation of some 250 French business representatives who are striving to increase exports and decrease France's negative trade balance with the U.S. During the press event, Jacques Dillard, director of the Compagnie Generale d'Electricite, said France's electronics industry is among the world's most formidable and is prepared to export telecommunications equipment, hydroelectric power stations, self-propelled electric rail cars, terminals and components for undersea cable systems, batteries for aircraft, office automation equipment and 800 kV circuit breakers.

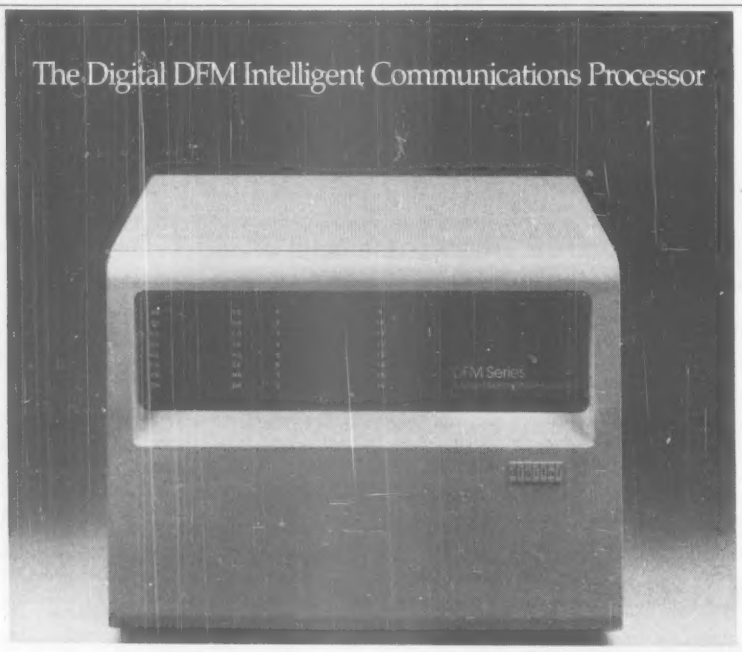
PARIS — Telesystems has been awarded a $250,000 software contract from Videotex Systems Ltd. of Wellington, New Zealand. Telesystems will reportedly develop a new videotex software package based on its existing French Teletel software, which will drive the other company's proposed videotex services.

JAPAN

TOKYO — Shipments of computer terminals and peripherals for general purpose computer systems are predicted to increase in fiscal year 1984, according to the Japan Electronic Industry Development Association (Jeida). Figures from Jeida's 1983 industry census showed a 23.6% jump in revenues and a whopping 78% leap in shipments. The most significant growth has been in floppy disk drives and character display equipment. Jeida is forecasting a similar growth rate for 1984.

TOKYO — Japan System Engineering Corp. has unveiled a Japanese language version of Ashton-Tate's Dbase II for the Japanese IBM Personal Computer. The company is already marketing Dbase II, a data base management system, for Nippon Electric Co.'s NEC PC-9800 16-bit microcomputer. The new product is priced at $1,200.

HAMAMATSU — Nippon Gakki Co. Ltd., a newcomer to the personal computer market here, has introduced a line of music synthesizer home computers that use Microsoft, Inc.'s standard soft read-only memory cartridge. Nippon Gakki, a division of Yamaha MSX System, is reportedly one of the world's largest manufacturers of musical instruments. The new Music Computer CX-5 and Home Computer AX-501 systems are said to feature FM sound and related musical playing capabilities.



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Development Project One Year Old

Swedish Firm Launches Semiconductor Blitz

By Gunnar Ericsson
CW Sweden

STOCKHOLM — Radio Industrins Fabriks AB (Rifa) has taken the lead in the production of gallium-arsenide (GaAs) semiconductors here.

A year ago, Rifa formally launched a development project in GaAs technology, and today the firm is ready to produce laser diodes, phototransistors, Fet transistors and photodiodes in quantity. The Swedish Air Force has already placed an order for GaAs electronics for a radar system in its new fighter plane, JAS.

The GaAs components are said to function up to seven times faster than conventional silicon semiconductors, and the amount of information transmitted is appreciably larger, which makes the radar system much more sensitive to weak signals from airborne fighter planes.

But Rifa expects to have an even larger market in various satellite-transmitted television projects located throughout Europe, which are slated to be completed within a few years.

These TV-satellites are going to be equipped with GaAs technology, and the parabolic antennae in the receiving end will use GaAs technology as well, Rifa said. This means that the initial development costs (estimated at $1.3 million) will be amply recovered.

Rifa was founded during World War II to compensate for the wartime cutoff of imported electronic components. Rifa is now the largest producer of electronic components in Scandinavia, with 2,000 workers scattered throughout Sweden, France and Australia and with gross sales of about $52 million in 1982. In recent years, the company's strategy has been to specialize in tailor-made solutions for various industrial problems.

Ironically, the Rifa GaAs project was originally lead by a Japanese expert — Dr. Takashi Ishii. Ishii, who had previously worked at Mitsubishi Electric Corp., became fond of Sweden during a stay in 1975 as a visiting scholar.

"We were lucky," says Rifa's president Stig Larsson. "Without the help of Dr. Ishii, we could not have got as far as we did."

Larsson laments the fact that Sweden's heavy taxes lure many experts away from the Swedish industry. "This is a pervasive problem in Sweden. We cannot offer the same terms of employment like American firms . . . because of this, a lot of good people have gone west after salary offers that we cannot compete with. Previously, you had groups of idealistic researchers who considered work the important thing in life. This breed has by now become almost extinct, and all that matters nowadays is a good life-style for the researcher and his family."

Another big problem for Rifa has been its inability to market itself successfully. The marketing department is now gearing up to counter these charges, according to Larsson. "Companies in need of fast transistors and diodes are not going to escape the fact that Rifa exists. It is not enough to beat the Japanese and the Germans in their own home markets [GaAs technology] — it also takes a perfect marketing organization."

The company has had to apply rigorous security arrangements, which is rather unusual in the open atmosphere of Swedish society. But there are probably a lot of people around wanting to take a peek at the developments at Rifa, according to Larsson.

"When you know that not everybody working in the Soviet embassy in Stockholm is exactly a diplomat, we will feel better when our patent applications are granted," said Rifa's marketing director, Lennart Forsberg. "Maybe then we can loosen up on security a bit . . . without trumpeting too much what we are doing."

Ericsson is assistant editor at CW Sweden.

International Report

Courses Offered Through Micros

NEW YORK — American Management Association (AMA) has announced that it will offer management courses through the use of personal computers and a telecommunications link this fall.

Using the services of Telelearning Systems, Inc. of San Francisco, the network provides the opportunity for the student to interact directly with a live instructor.

In October, five courses for managers, supervisors and administrative support personnel will be available.

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Schools Not Prepared for Computer Invasion: Study

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Schools, in their headlong rush to obtain computers, generally do little planning, fail to recognize the lack of adequate educational software and too often realize few positive teaching results, according to a new study on high school education in the U.S.

The study, which is from the Carnegie Foundation for the Advancement of Teaching, stated: "Computers are now in. The floppy disk has become the badge of progress. And no school district that wants to be 'with it' can afford not to have at least one computer in each school.

"Educators seem confused about precisely what the new miracle machines will do. But the mood appears to be 'buy now, plan later.'"

The book-length study, titled "High School, A Report on Secondary Education in America," presents a comprehensive plan for U.S. high schools, which includes four main objectives: mastery of English, a core curriculum with a global view, better working conditions for teachers and instilling a sense of community service in students.

Lack of Progress

The report's author, foundation President Ernest L. Boyer, former U.S. commissioner of education, noted the potential of computer technology in education, but decried the lack of progress in applying that technology to the real needs of teachers and students.

"Computer companies are aggressively marketing hardware and even giving sophisticated equipment to the schools while failing to help educate the teachers and failing to prepare first-rate material linked to school curricula or objectives," Boyer wrote.

The point, he said, is that "all too much of today's computer instructional material resembles a book cover without pages.

"The technology is available — and increasingly affordable — but educational content that makes the investment worthwhile is largely lacking."

To improve this situation and fulfill what the foundation called "a moral obligation" on the part of vendors, the study recommended that "every computer firm selling hardware to the schools also establish a special instructional materials fund" to help teachers develop high-quality, school-related programs.

The study also suggested schools base their purchasing decisions "not only on the quality of the equipment, but also the quality of the instructional material available . . . It is strange that while textbooks are endlessly scrutinized, it seems computer software is virtually ignored."

The study went on to recommend that a national commission that includes classroom teachers be named to evaluate the quality of current educational software. Also, the study called for federally funded technology resource centers at 10 regional university sites to demonstrate the latest technology.

The lack of planning by schools for computer use is an "essential point," according to the foundation, which concluded that before purchases are made, schools should answer the following questions: "Why is the equipment being bought?" "How good is the available software?" "What educational objectives will be served?" "Which students will use the new equipment?" "When and why?" and "Are teachers able to fit the technology into their curricula?"

In using computers in schools, the study said, "the first priority is to teach all students about the technological revolution of which computers are a part." The report said the "current inclination to equate technology with computers" was "disturbing."

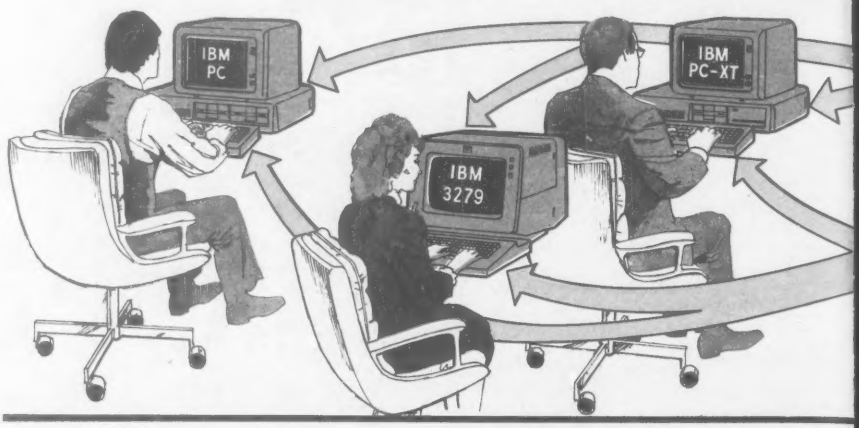
Secondly, the study continued, schools should make it possible for students to learn with computers and to use computers in libraries and classrooms for reference and information-gathering activities.

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To Neutralize Automation's Effects

U.S. Urged to Support Job Training Programs

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Concerted federal support for job training programs is necessary to offset the employment dislocation caused by increased automation, a congressional committee was told recently.

In testimony before the Joint Economic Committee Sept. 16, MIT Professor Harley Shaiken called retraining "a critical priority . . . and an important component of economic growth." He told the committee that "any meaningful training program will of course be expensive. The only course of action more expensive is inaction.

"Adequate training for those individuals who are affected by these far-reaching changes [caused by computer technology] is essential both for a humane transition and productive use of the new technologies," he told the committee, which is holding a series of four hearings on the job training needs of American workers.

Shaiken suggested that the best method "is probably a direct subsidy to the training institution, particularly when smaller firms are involved. Federal coordination is necessary to ensure that the right jobs and the right number of jobs are targeted." He added that "pretraining — training that takes place before unemployment results in industries that are undergoing major transformation — is preferable to retraining once unemployment results.

"A real danger, however, is that the long-term unemployed will receive the least adequate training as they lose ties to the industries in which they once worked," he said, adding that "instruction in skills alone does not constitute a meaningful retraining program. An adequate stipend while training takes place and sufficient financial aid to move into a new job are necessary."

Similarly, Dr. Marc Bendick Jr., an economist with the Urban Institute, Washington, D.C., told the committee there is a need for federal initiatives, including "new incentives to raise the overall level of training by American industry."

Initiatives Needed

Also, he said, there should be new initiatives "to teach job-search techniques to dislocated workers, new flexible institutions for short-term assistance to local labor markets in distress . . . reform of certain 'anti-training' provisions of the federal income tax and unemployment insurance program and establishment of a new effort to provide pretraining basic literacy skills to the adult unemployed."

At the same time, Bendick said, there should be renewed investment in existing federal training programs for disadvantaged adults and for young Americans.

In general, he added, "The most fruitful approach to retraining mid-career workers to keep up with changing times is to expand training through employers. Mid-career training is largely a matter for the employed rather than the unemployed, and it is largely a matter of a continuous stream of small-scale training activities rather than of large-scale retooling for an entirely new career."

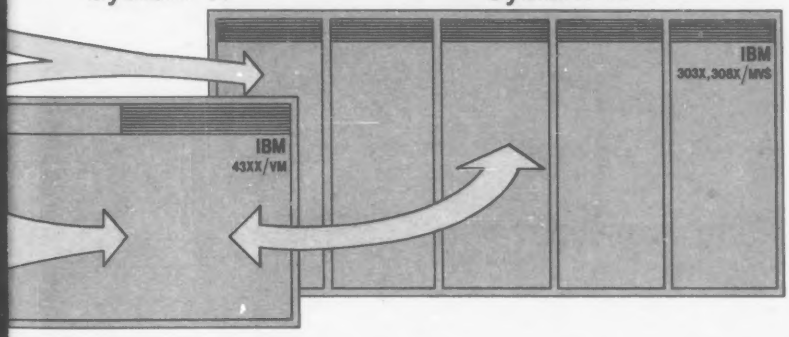
Sheldon Friedman, research director of the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW), told the committee that job training should be part of an overall national industrial policy.

"To assure steady economic growth and full employment," Friedman said, "we need a coherent, full employment macro policy, coupled with an industrial policy which includes a system of national planning to manage our resources in a manner that best serves the country's needs."

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Study Pinpoints What Makes Managers Effective

PORTLAND, Maine — A two-year study of the makeup of effective DP managers revealed a "core" set of attributes found to characterize all highly effective managers, whether they operate in DP or non-DP environments, according to Management Research Group (MRG) here.

"Highly effective managers seem to be taking the view that perhaps their single most important role is to help facilitate the effective and successful performance of their subordinates," Thomas M. Rand, MRG president, said. Rather than taking on the responsibility for managing this performance, these managers create a work climate that serves to motivate subordinates. The study found that highly effective managers:

- Define management as the process of achieving results through others. Therefore, to a large extent, a manager's success rests with how effectively he influences the behavior and performance of his subordinates. The study found that highly effective DP managers also try to address interpersonal conflict "squarely and use it constructively." Less successful DP managers tend to be more reclusive, according to the study.
- Were very clear in defining their performance expectations and performance standards for subordinates, resulting in a heavy emphasis on the "communication process."
- Have high standards of excellence for themselves and their subordinates, creating an achievement-oriented climate.
- Balance a concern for excellence and performance and an interest in the welfare and career development of their subordinates.
- Know what is going on with their units by establishing systems that monitor the ongoing performance of subordinates.
- Provide subordinates with feedback based upon previously defined performance expectations.

Certificate Program Boosts Grads' DP Career Prospects

JOHNSTOWN, Pa. — While others worked on their tans or caught up on their reading this summer, 19 graduates here at the University of Pittsburgh at Johnstown (UPJ) used the season to advance their career prospects in the field of applications programming.

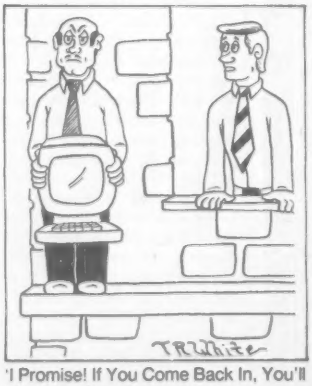
The students recently completed an 18-week certificate program offered by the school's Computer Programming Institute (CPI). During the 21-credit summer course, first offered this year, the students received instruction in computer programming concepts and techniques from industry professionals and UPJ's business economics and computer science faculties. The curriculum is based on the Data Processing Management Association's model curriculum for computer information systems education and was designed to prepare students as applications programmers in business and industry, a spokesman said.

The program, which costs about $3,000 and is limited to about 30 college graduates, centers on daily classroom and laboratory work, in addition to seminars and a team project involving systems design for a major corporation. Through batch processing and time-sharing, students have access to the school's computer center, which operates a Digital Equipment Corp. triprocessor Decsystem-1099 and a dual-processor Decsystem-1099.

Students use a variety of software, Basic, Digital Research, Inc.'s CP/M operating system, Cobol-80, the Condor package from Condor Computer Corp. and data base management systems; students also work on the Apple Computer, Inc. Apple II and Franklin Computer Corp. and DEC microcomputers.

Students in the CPI program are required to write a variety of individual programs in Cobol and Basic and are trained to view software development from a software life cycle perspective, the UPJ spokesman said.

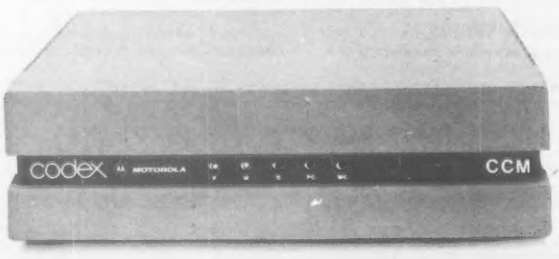
More information about the CPI program, which runs from late April to late August, is available from the Continuing Education Office, 150 Biddle Hall, UPJ, Johnstown, Pa. 15904.

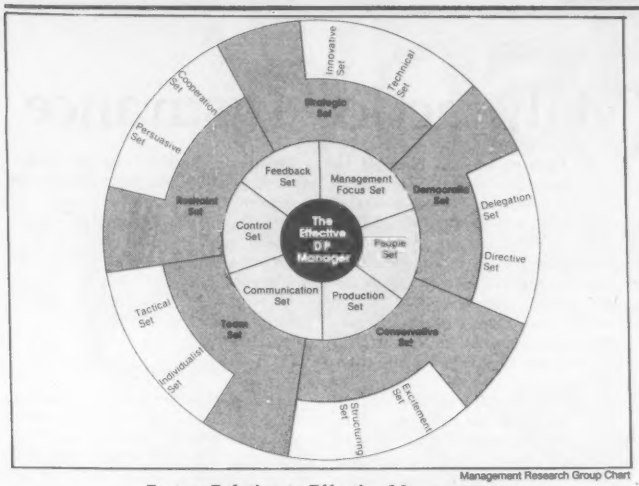


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Management Research Group Chart

Factors Relating to Effective Management

Effective DP Managers Seen Nontechnocratic, Flexible

By Patricia Keefe
CW Staff

PORTLAND, Maine — In contrast to the traditional image of isolated technical specialists, effective DP managers are both nontechnocratic and spontaneous in their interpersonal dealings, according to a recent study by the Management Research Group (MRG) here.

MRG is an organization composed of industrial psychologists and data processing professionals that conducts research on factors relating to both managerial and organizational effectiveness. Several hundred data processing managers across the country participated in the firm's two-year study of the characteristics and attributes of effective DP managers. Also contributing to the study were the immediate subordinates and superiors of these managers who were asked to rate and describe their co-workers.

Effective DP managers share six characteristics critical to all successful managers, according to MRG (see story on Page 22). In addition, a "critically important" result of the study indicated that highly successful DP managers possess five additional attributes that "speak to the complexity of [their] role and also to the unique pressures seen to exist in managing the DP environment," according to MRG President Thomas M. Rand. The specific attributes found to characterize highly effective DP managers include:

- An essentially democratic approach to management, making subordinates feel that they are "part of the action" and that their ideas and opinions are highly valued.
- The creation of a strong team atmosphere where subordinates feel that they are contributing to a group effort and where competition and individual stardom is discouraged.
- A more strategic orientation, resulting in better planning and anticipation of the consequences of their actions and decisions. It follows that highly effective DP managers were found to be "reasonably" future-oriented in that they attempt to predict what will happen and prepare for these situations. Additionally, these DP managers appeared to have a wider perspective on how the organization operates and understood how their efforts contribute to overall organizational effectiveness, the study said.
- A tendency to reject highly conservative thinking and to avoid basing their actions purely upon a status quo position. Not only are they willing to consider doing things differently, but highly effective DP managers "show some degree of intellectual flexibility not seen [in] their less effective counterparts," Rand said.
- Reasonably spontaneous and casual interpersonal dealings with subordinates. These managers do not show the stereotypical description of the reclusive, highly technical "green eyeshade" accountant, the study said. Moreover, highly effective DP managers feel reasonably comfortable dealing with people on nontechnical issues and do not use their technical knowledge as a potential barrier to effective interpersonal relationships, Rand added.

The results of MRG's study have been used to develop the firm's Management Effectiveness Analysis package. Described as a personal diagnostic and development tool designed to help DP managers identify their strengths and weaknesses, feedback from this package focuses on personalized developmental action plans to help each manager improve his overall management effectiveness, according to MRG.

The package is available for $195 from MRG at 402 Congress St., Portland, Maine 04101.

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Policies Cover 'Errors and Omissions'

User Suits Give Rise to 'Malpractice' Insurance

By Tom Henkel
CW Staff

Computer-related mistakes cause disruption in many businesses each year. When the mistakes are serious, or the disruption is catastrophic, some firms have resorted to suing the vendors of the products that caused the problems. Convinced that more user-vendor lawsuits are on the way, a handful of insurance companies are offering what amounts to malpractice insurance for vendors of computer-related products.

Technically, anyone who acts negligently in building, selling or programming a computer system can potentially be held liable for financial or physical losses incurred when a computer system does not function properly.

But according to Boston attorney Robert P. Bigelow, relatively few lawsuits result from computer system foul-ups, mainly because negligence is hard to prove. And except for a few cases, most judgments in favor of slighted users have been relatively soft.

Nonetheless, enough vendors and consultants are apparently worried enough about potential lawsuits to carry insurance against the potentially devastating consequences of a large lawsuit.

"Malpractice is a fancy term for a particular kind of negligence," Bigelow said, noting that a computer error can have a cascading effect on an entire company and possibly the people who buy goods and services from that firm.

Insurance companies call these specialized policies "errors and omissions" or E&O policies. Basically, E&O policies cover the "intangible" losses a user might incur if a vendor's product or service fails, explained Raymond Wahl, vice-president of the National Union Fire Insurance Co. of Pittsburgh, Pa. (the firm is headquartered in New York).

Extra Protection

Most vendors carry general liability policies that protect them against the physical damage caused by their products, but E&O policies provide extra protection for the damage that cannot easily be seen.

For example, a software house might sell a program that not only does not work properly, but also destroys data or damages other programs on the user's system. Wahl said if the user can prove the vendor's product caused extreme damage to his computer system, the vendor may wind up paying fairly high damages, such as the cost incurred in replacing the lost data or rebuilding damaged programs.

Another advantage to vendors is that E&O policies often cover the defendant's legal costs, which can also be high, Wahl added.

The E&O policy can be used by firms other than those whose reason for being is selling computer-related goods and services. For example, Wahl said, many DP departments develop applications packages for in-house use that company officials decide to market to other users. Once the in-house developed program is sold, the originating firm can be held liable for major errors in the code, Wahl said.

With more small businesses turning to minis and microcomputers to manage their financial affairs, Wahl said more user-vendor lawsuits are likely. He noted that the smaller user tends to depend on the claims the vendor makes about a product more heavily than the large users. He added that courts tend to be more sympathetic toward smaller users.

Insurance companies are being selective about the firms to which they will offer E&O policies. "It's probably harder for a one-man shop to get a policy than a 10-man shop," Wahl said, adding that unlike auto policies, insurance companies are free to set premiums on E&O policies to match their risk.

But while insurance companies are willing to offer E&O policies to firms offering DP-related goods and services to end users, they do not appear to be as willing to offer similar policies aimed at protecting DP shops from inadequate employees.

While companies can get insurance to protect them from illegal acts committed by employees, such as electronic theft, insurance companies do not generally offer policies protecting against incompetent DP employees, noted Jeff Isreeli, a vice-president at the New York insurance brokerage firm of Marsh & McLennan Co., Inc.

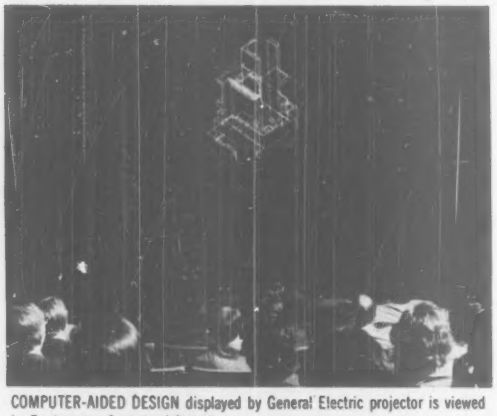
Difficult Task

Noting it is not necessarily impossible for a large firm to have a policy custom-written to meet a specific need, Isreeli "wouldn't be surprised" to see policies offering this type of protection becoming available "in the next year or two." However, defining employee negligence and pinning the blame on a particular segment of the company is often a difficult task, he said.

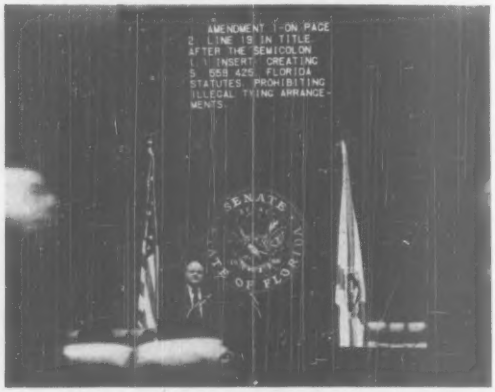
It is possible for an employer to sue an employee for negligence, but "it is extremely rare," Bigelow noted. It is usually easier to simply fire an employee the company feels is incompetent.

Even though a computer system problem can have an impact on the whole company, Bigelow said he does not expect employer-employee suits to become more common.

Such suits tend to be rather expensive, and suing an employee often causes bad labor relations with the rest of the employees, he contended.



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What Do DPers Need for Next Step?

Q My responsibilities include finance, accounting and information services. We have some senior people in information services, but other corporate people, including myself, lack confidence in DPers' management ability and are reluctant to mainstream them into other areas.

I'm going to lose several key people unless I can present them with some career advancement opportunities. Do you have any recommendations?

A I recognize that this is an immediate problem, but it has deep roots, and there is no quick remedy. DP people moving up the ladder sometimes sacrifice management education to maintain a high level of technical expertise. This is an unfortunate misalignment of priorities.

An expanded set of management skills should be emphasized at each level of increasing responsibility. General education should begin to emphasize management skills after the first promotion.

I would suggest that you modify any existing career development program to emphasize ongoing management education. Given the proper educational environment, an information services manager should be at least as well prepared as managers in other disciplines to move into corporate management.

As for your immediate problem, confront these people with corporate management's reservations about their ability to take on greater management responsibilities. My guess is that they will agree and be willing to work with you on a program of self-improvement.

Q We anticipate that our very small (one person) computer center will grow to three people by the end of next year. Our expanded responsibilities will eliminate four clerical positions.

All of the people in these positions have expressed an interest in retraining for the two new DP positions. Prior to the announcement of the personnel changes, their interest in DP was lukewarm, at best.

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Q/A Turnaround Time

By Larry E. Long

I feel an obligation to hire from within if possible. Three years ago, I was a bookkeeper and had no background in DP. My problem: How do I pick which ones to train for the new positions? Is there any way I can determine whether they will be good programmers?

A Logic aptitude tests exist that supposedly test one's ability to become a programmer. However, I don't feel comfortable with these tests. There are just too many exceptions: People who fail dismally may make excellent programmers, and people who achieve high scores may never write a program. These aptitude tests do not reflect the all-important intangibles.

If you can delay the decision for a few months, clear it with your boss, then announce that both of the positions will be filled from these four people.

Encourage them to develop some background in the computer field. Recommend a DP fundamentals course and perhaps a programming course at a local college. Provide some after-hours instruction on equipment operation and specific applications systems, then invite the DP candidates to work with you for a short period each day.

I would anticipate that at least two of them will show a genuine interest in a career change and will make the commitment.

If one or none is willing to retrain, then you may have to recruit people outside the company.

Q I work in a staff capacity for the chief information officer of a Fortune 500 company. Both of us have strong personalities and irreconcilable differences. I've been successful with the company and hold a well-paying position, but have no opportunities for advancement.

My boss would like to see me resign, and for the last 18 months he has done everything possible to make my life miserable. Will resigning affect my desirability as I search for a new position?

A Conduct your search from a position of strength. Retain your position until you secure suitable employment elsewhere. You may be toiling under difficult circumstances, but you may be better off in the long run. It is much more difficult to obtain employment when you are "between jobs."

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

Planning, Standards Also Needed

Cooperation Seen Essential to System Integration

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — Cooperation, planning and standards are essential if the current difficulties in integrating mainframes, personal computers, time-share systems and office automation equipment are to be overcome.

Presenting this view at the Third Annual Conference on Personal Business Computers held here last week, Jack Geer, vice-president and group systems manager at Bank of America, said user help is needed in prioritizing and defining business computing requirements.

"More effort will be required of users to manage and understand technology because as computer technologies become an integral part of business, all personnel will be affected," he said.

Lack of Understanding

Geer claimed the present lack of understanding of the issues by end users is exacerbated by confusing market claims and the existence of systems that have local-scale applications while lacking the ability to integrate into a large corporate environment.

"When users select systems that cannot be integrated, effectiveness can be limited, and systems may need to be prematurely replaced. This problem can be minimized by information workshops to educate line managers to the realities and appropriate uses of computer technologies," he told the conference, which was sponsored by the National Institute for Management Research.

Major users of computers, Geer contended, need to understand that information is a resource that must be managed as an integral part of the overall business. To provide appropriate user information, end-user computing support groups should be set up, and they will be needed to understand individual business requirements and priorities.

"In addition, they will need to understand new technologies that are developed by internal corporate technology development groups as well as vendors to assist users effectively in fully utilizing appropriate systems within their units," he added.

Geer told his audience it is better to plan and then design appropriate systems to accommodate computer hardware and support the needs of users than vice versa. The job of end-user computing groups, he maintained, is to find solutions for information resource issues, both technical and human.

"To accomplish this, end-user computing groups will require senior management support in understanding the issues and direction from senior management in developing a strategy to define coordinated information management goals and business goals," he said.

Turning to the question of standards, Geer said software will be the key product for the next 10 years, but it will be difficult to standardize specific software products needed to ensure evolution to more productive levels.

"For this to happen, it will be vital that corporations do not lose the training, understanding and productivity achieved from existing systems as software becomes more efficient and user-friendly and as fourth-generation languages are developed."

Concerning standards in communications technology, Geer said a key requirement is that users have the ability to communicate back and forth with a variety of systems and be able to file and retrieve information. Given that most systems are used as stand-alone devices, he asserted, it is inappropriate to determine present or future requirements or define standards and technologies by using existing word processing systems for establishing standards about file-level compatibility.

Prime User Meet Set for Nov. 6-8

WOOD DALE, Ill. — The Central Prime Users Group will hold its sixth annual meeting Nov. 6-8 at the Arlington Park Hilton in Arlington Heights, Ill.

The meeting, for all users of Prime Computer, Inc. systems, will include discussions on maximizing system throughput, the role of the system administrator and Prime's source-level debugger. According to the Users' Group, this list of topics is tentative and subject to change.

The meeting committee is still looking for speakers and for people willing to lead group discussions at the conference.

The meeting fee is $70 for Prime users. The vendors' fee is $100. Ports on the Prime 2250 system are available to vendors for purposes of demonstration for $300. More information is available from Central Prime Users Group, 130 North Ash, Wood Dale, Ill. 60191.

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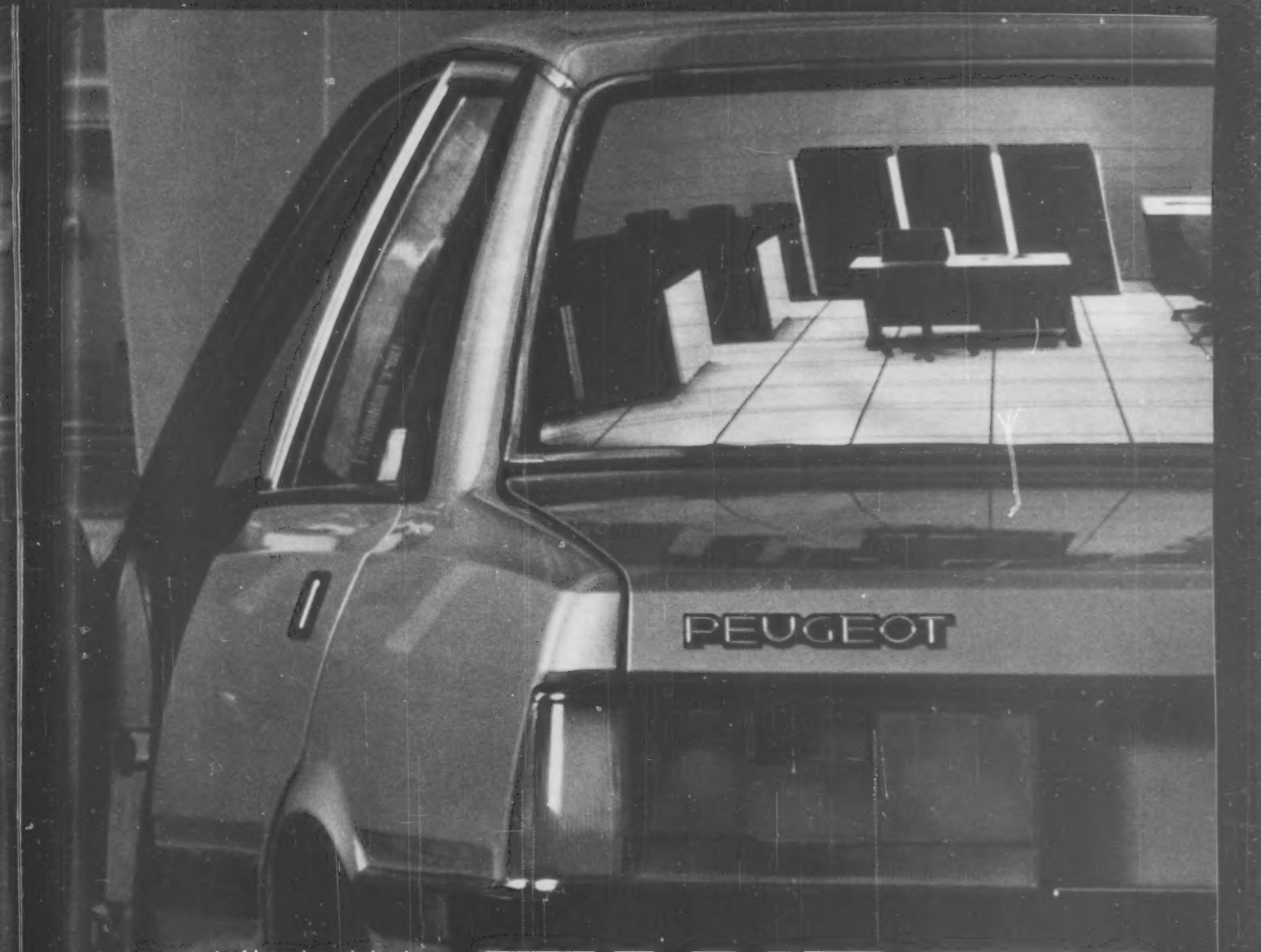
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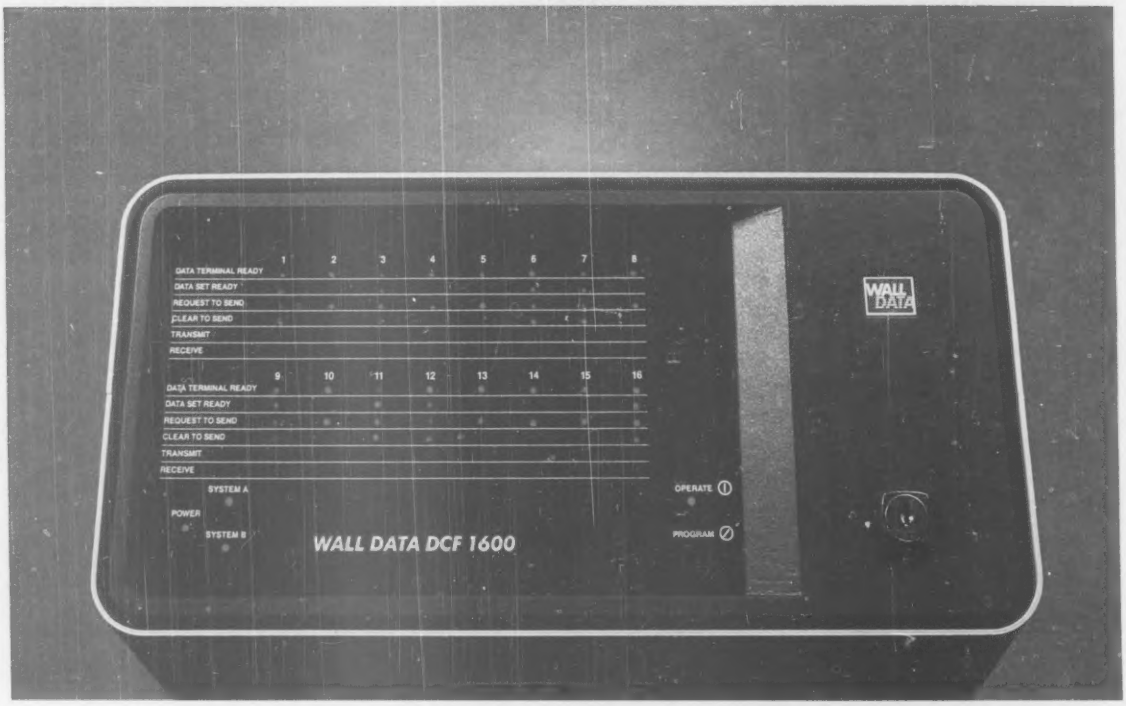
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At Business Micro Meet

DSS Planning, Strategy Urged

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — Decision support systems (DSS) require carefully laid out strategies and plans if they are to be effectively implemented in large organizations, according to an industry expert.

In a paper presented here at the Third Annual Conference on Personal Business Computers sponsored by the National Institute for Management Research, Lawrence Provisor, principal at the management consulting firm of Index Systems, Inc., maintained that DSS planning is not receiving the attention it needs.

"In the world of conventional transaction processing, operational or management information systems, managers increasingly devote very substantial effort to the development of comprehensive long- and short-range systems plans. But practically no one makes this same sort of effort for DSS planning," he complained.

For most organizations, Provisor contended, planning for DSS is not a top priority because it represents a small proportion of present information systems expenditures and, therefore, does not take up many of the resources allocated to information systems staff.

However, he contended decision support systems comprise the fastest growing segment of the information systems portfolio, aided and abetted by a growing supply of tools available as mainframe packages, on inexpensive personal business computers.

"If one looks ahead, it is not difficult to see the day approaching when, in many organizations, decision support systems activity and its attendant end-user computing will represent a clear majority of information systems expenditure and usage," he predicted.

Even today, the consultant continued, there are a few information systems managers who have allowed this sort of growth to occur in a poorly planned fashion and, as a result, have either had their management clamp a tight lid on their budgets or have seen the DSS/end-user area taken over entirely by another part of the organization.

In the face of the growth of DSS, Provisor attested, information systems managers are exhibiting two very different kinds of behavior: pushing and controlling. Pushing organizations, he claimed, are characterized by lots of doing but not much managing in the DSS area, whereas in the controlling approach, there is lots of managing but not much doing.

"In neither case is there much overall planning going on anywhere," he noted. "Both the pushers and the controllers are responding to valid pressures and risks but are failing to recognize that doing and controlling are separate pieces of an overall process that starts with planning."

On the question of selecting personal business computers and their attendant DSS software, Provisor suggested that information systems managers make a thorough analysis of their decision support requirements before purchasing a system.

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Network Stretched Between Cities

University's Tape Library Supports 200 Users

SYRACUSE, N.Y. — With more than 200 terminals around the Syracuse University campus in a network stretching from New York City to Utica, N.Y., the university's Administrative Data Processing (ADP) department has a staggering tape library management task.

Joe Canestraro, manager of computer operations for the university, said his department "serves all the administrative departments of the university and a good number of academic departments."

The department was formed as a separate entity in 1977 when administrative DP functions were split from academic DP functions. "The tape library was in a state of near chaos or controlled mayhem," senior systems programmer Linda Rodriguez recalled recently. "ADP decided to straighten things out with a tape library management system."

Valu-Lib, a tape library management system produced by Value Computing, Inc. of Cherry Hill, N.J., was installed at that time. This past July, the department switched from an IBM 4341 to an IBM 3083, at the same time installing Version 4 of the Valu-Lib package.

Training Made Easier

With more than 200 authorized users spread about the campus and along the network, Canestraro said he has found the new version makes training easier. After he spends a full day going over commands, "New lead operators can use Valu-Lib proficiently in one to two weeks."

As the main end user, Canestraro also appreciates the thoroughness and reliability of the system's standard reports. "We use the retention report to help control catalog tapes and to avoid a lot of problems. We have never lost a tape because of Valu-Lib," he said.

In addition, the product's reports have helped Canestraro keep the number of tape volumes from "growing exponentially because we can keep an eye on what tapes a user had."

Canestraro found enhanced communications facilities far more convenient for everyone to use. "Under previous releases, operators had to come into my office and use my master console, which was cluttered up with thousands of messages. Now, through CICS or Vtam it's so much easier . . . They run a batch report in the morning, pull tapes and then do the necessary changes to [volume serial number] commands to verify cleaning dates and so forth."

The redesigned package offers all of its facilities in both on-line and batch modes.

Systems programmer Rodriguez installed the new version and concluded, "It's a much cleaner system now. Value Computing Subsystem works with IBM code and concepts, not in spite of them." She also found it less structured than the previous version.

Menu screens enable new operators and system programmers to master the system and become productive in a short time. "The data is at your fingertips — you never have to worry about a tape's status. Here you have a great interactive tool with none of the drawbacks of an unwieldy batch job," Rodriguez said.

"When you scratch a tape using Valu-Lib, it's gone immediately," Canestraro said. "It can be hard for people accustomed to other tape library systems to believe this — they're used to having a measure of 'safe' time before the tape is really scratched."

He added that operators can use any on-line terminal in the data center; up to 20 different user identifications can be signed on at a time. Each site can define user levels in an internal table, so that access to data base maintenance screens may be strictly controlled.

The operating system used presently is IBM's VS1 under VM, but at the end of the year a switch will be made to MVS, according to Joe Canestraro. "When we're on MVS, we won't be hemmed in by a limited number of partitions. So we'll let the programmers look up their own [volume serial numbers], and the like because we can restrict them to specific types of displays."



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Packages Help Schools Manage 230,000 Students

MIAMI — The administrators of Florida's Dade County School District, the fourth largest school system in the U.S., have met the challenge of tending to the academic needs of nearly a quarter million students.

The district keeps track of the 230,000 students in more than 250 schools through the use of Software AG's Adabas, a data base management system, and Natural, an on-line applications development system, in a series of districtwide data base systems.

According to Al Saber, director of operations at the Dade County school district's DP center, both packages "have been instrumental in enabling Dade County to keep track of its students and to implement a range of systems such as electronic mail, individual students' school assignments, grade reporting, class ranking, textbook inventory, school construction and food services."

The school district's data base was established four years ago. The computer center uses National Advanced Systems, Inc.'s 9050 with 16M bytes of main memory and 16 channels and IBM's OS/MVS operating system. The selection of Software AG's products came after a detailed evaluation of several offerings.

One of the key selection criteria was on-line query response. Additional criteria included ease of installation, ease of use by both DP and non-DP personnel, data base creation time, security, adaptability, backup and recovery provisions, impact on computer facilities, quality of support personnel, documentation and training.

Biggest Benefit

According to DP Director Gene Brewer, one of the system's biggest benefits was the implementation of an electronic mail service, which provided immediate distribution of memos to and from its elementary, junior high, senior high and vocational schools.

"Administrators log on every morning and afternoon, and the messages are automatically distributed to the right people," said Brewer. "Errors are few and far between, and there are no excuses not to know what's happening."

Prior to the electronic mail system, intradistrict communications relied heavily on a telephone tree for urgent messages. The superintendent or an assistant would personally call the principals of the 24 senior high schools, who in turn would pass the word to the 46 junior high principals, who would then call the nearly 200 elementary schools.

"Having a terminal right there in the office allows each administrator to get the information he needs without waiting. Also, memos don't get lost," Brewer said.

District Data Base Administrator Allen Stedman attributes much of the success of the system to the on-line applications development system.

"Natural's ad hoc ability is terrific," he said. "Most of the staff, though traditionally Cobol-oriented, found training in Natural took a minimum effort."

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Group to Fill Gap Between Users, Academicians

By David Myers
CW Staff

NEW YORK — Seeking to "fill the gap" between academic conclaves and users groups, the Association of Computer Professionals has set up shop here as a nonprofit trade organization.

Sy Bosworth, president of the group and a 15-year consultant in the computer industry, said the ranks are open to programmers, software developers, hardware designers, consultants, teachers, marketers, writers and students. The group's aim is to exchange information while promoting its members' careers, he said.

"My feeling was that there was a gap between academic organizations which have a largely theoretical orientation and the microcomputer groups who are mainly user groups," Bosworth said in explaining why he had founded the association.

The latest computer industry trade group will publish a monthly newsletter devoted to technical developments in software and hardware as well as marketing techniques and what Bosworth called "earnings opportunities."

Breakfast meetings and a lobbying effort are also possibilities, he said. Dues are $55 a year, but a charter membership in the group costs $10 less, according to Bosworth. Student memberships are $20.

Bosworth said he had provided all the initial funding for the group, but stressed it is "a nonprofit, mutual benefit organization. It was not set up for a return on an investment."

Bosworth emphasized that there are no minimum age or academic degree requirements for membership.

"A person working at home on a program he hopes to sell is by that definition a part-time professional. Some of those who could be potential members are professional vandals — hackers. We hope to turn them to good instead of evil," Bosworth said.

Handles 1 Million Claims/Year

Insurer's Network Cuts Paperwork

RICHMOND, Va. — With the aid of a telecommunications network developed more than a decade ago, Blue Cross/Blue Shield of Virginia and about 80 of the state's hospitals are now enjoying some healthy benefits through the company's paperless claims processing system.

Until 1969, the state's health care providers had to fill out patient claim forms by hand before mailing them to Blue Cross/Blue Shield headquarters here, where the information in those forms was keyed into the company's IBM 3033 mainframe.

In that year, the company began a pilot interactive claims processing system whereby providers key patient claim information directly into the mainframe through terminals in hospitals and doctors' offices. The company originally employed Telex Computer Products, Inc. Model 241 terminals, but recently replaced them with newer Telex Model 476s.

According to John Lilly, telecommunications consultant for Blue Cross/Blue Shield, both the company and the participating hospitals have benefited greatly from the system. The Richmond Plan has the lowest operating costs in the nation, owing to reductions in the need for forms and claims processing and mail room personnel. Lilly estimates that the network allowed the company to handle the more than one million claims submitted by hospitals last year at an average savings of approximately 20 to 30 cents per claim.

Because about 95% of claims is submitted via the telecommunications network, Blue Cross/Blue Shield employs only three claims examiners to review the remaining manually submitted forms. The company estimates that it would require an additional 20 people to handle that volume of claims without the system.

The system's interactive capability allows submitted claims to be adjudicated immediately, enabling hospitals to determine if a patient is insured or whether a patient's particular coverage will pay for the care provided. Providers are also reimbursed on a more timely basis, with most claims processed in only 14 days.

"Hospitals are perfectly happy with this system," Lilly said. "The main benefit is better cash flow, which is very important. They also get immediate response to their patient inquiries. We can answer most questions right away."

As part of its automated claims processing system, Blue Cross/Blue Shield of Virginia has terminals in approximately 80 hospitals throughout the state, with 275 additional Telex terminals in the company's Richmond headquarters and another 26 terminals in nine district offices. A number of doctors access the mainframe directly from their offices using Texas Instruments, Inc. TI 765 microcomputers.

According to Lilly, similar systems have been set up at Blue Cross/Blue Shield agencies in North Carolina, Maryland and Florida.

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ACM to Hold Meet Feb. 14 in Philadelphia

PHILADELPHIA — The 12th Annual Association for Computing Machinery (ACM) Computer Science Conference will be held at the Franklin Plaza Hotel in Philadelphia, Feb. 14-16.

The central themes of each of the three days are "Factory of the Future," "Coping with Small Computers" and "Social and Ethical Implications of Computers."

Speakers include Dr. Karl Kemp of McDonnell Douglas Automation Co.; Ernest W. Kent, National Bureau of Standards; Mark S. Fox, Carnegie-Mellon University; Lawrence Tesler, Apple Computer, Inc.; Daniel D. McCracken, City College of New York; and Abbe Mowshowitz of Rensselaer Polytechnic Institute.

Fees for the conference are: members $55, students $10 and department chairmen $100, all preregistered. Nonmember registration costs $90.

Further information is available from Dr. Frank Friedman, Computer and Information Science Department, Temple University, Philadelphia, Pa. 19122.

UT Regents Approve MCC Center Project

AUSTIN, Texas — The Regents of the University of Texas (UT) System recently approved a $20-million construction project to build office and research facilities at the university's Balcones Research Center here for the new Microelectronics and Computer Technology Corp. (MCC).

The board appointed Golemon and Rolfe Associates of Houston as the project architect for the MCC center to be built on 20 acres of the Balcones Research Center in northwest Austin, where about 25 other UT Austin science and engineering laboratories are located.

The university plans to provide $5 million in funding for the project, with the remainder coming from the private sector.

MCC, a national research and development venture involving more than a dozen private firms, will undertake cooperative research aimed at maintaining U.S. preeminence in microelectronics and computers, particularly in the fields of advanced computer architecture, component packaging, software technology and computer-aided design and manufacturing.

The Regents also approved a $23 million construction project to renovate and expand UT Austin's Taylor Hall, which will house the Department of Computer Sciences, the Institute for Computer Sciences and Computer Applications and the Computation Center.

Multimedia Courses Available From ASI

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI) has announced the availability of four new multimedia courses:

- Created for senior management,"Executive Issues: Building the Computer-Based Architecture Bridge" provides architectural concepts and discusses computer-based architecture as a bridge between existing applications portfolios and the portfolios that must be developed to utilize the emerging technologies effectively within an organization.
- "MVS/SP JES2: Basic Operator Training" provides an introduction to MVS/SP JES2 operating environments by teaching the format of system messages and the differences between JES2 and MVS commands, as well as device control, system control and job control.
- "Mapping Facilities for IDMS-DC, UCF and ADS/Online" teaches how to use IBM 3270-type terminals for screen mapping. It covers on-line mapping, integrated data dictionary integrations and user-friendly screen formats.
- "The ADS/Online Education Series and Reference Library" teaches the steps in developing an on-line system. It addresses the systems design, programming and tuning considerations of applications using ADS/Online.

The cost for the courses ranges from $50 to $100 depending on sale or lease time. Further information can be obtained from Pat Sorrentino, ASI, 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

Better Postured to Meet Change

Relational DBMS Provides Utility Flexibility

EVERETT, Wash. — The deregulation of the telephone industry in 1982 forced many previously regulated and noncompetitive companies to become competitive fast, or suffer.

General Telephone of the Northwest, a subsidiary of GTE Corp., was better postured than its competitors to meet the challenge even though it had no more warning of the impending deregulation than anyone else.

In 1980, General Telephone had chosen Tandem Computers, Inc. Nonstop systems to handle its online transaction processing needs. Part of the Tandem solution was a distributed, relational data base management system (DBMS) known as Encompass. The flexibility of the relational model enabled General Telephone to utilize its existing applications software even though data bases distributed across three states had to be reorganized to meet the new business requirements.

Prior to the decision to implement the Tandem equipment, General Telephone had been using minicomputers — one for each of 16 operating divisions — to maintain records of the customer information needed to run the business and an IBM 3033 mainframe to manage billing applications. Capacity, response time and expandability were problems.

"General Telephone's reasons for choosing Tandem included hardware and software costs, the modularity of design allowing for easy expandability, the fault-tolerant aspects, the transaction-oriented approach, [GTE Telenet Telecommunications Corp.'s] Telenet certification and relational and distributed data base management capabilities," according to Dave Hoogerwerf, information management systems supervisor.

The minicomputers were replaced with six separated Tandem Nonstop network nodes and the application software converted to run on the Tandem equipment. Additionally, the Tandem systems were configured between the IBM 3033 mainframe and the IBM 3270-type terminals used for the billing applications. The same 3270 terminals could now be used for both the customer data base application formerly handled by the minicomputer systems and the billing applications still handled by the IBM mainframe.

In January 1982, AT&T and the Department of Justice announced an agreement in which AT&T would become eight companies, all competing fiercely with General Telephone for business.

For General Telephone, the practice of having each operating region manage its own phone markets and order systems was no longer practical. The information had to be available to the entire company and managed in a more centralized manner, Hoogerwerf said.

General Telephone regrouped its 16 geographic operating divisions into three functional regions, each with two Tandem nodes. As with the prior systems, each operating division maintained its own customer data, but now the data was grouped into the larger, functional regions. The six regional systems were linked together using Tandem Expand networking software. Through the network, each region now had remote access to data located at the other regions as well as local access to its own data. The entire redistribution was accomplished with only minor changes to existing applications software, Hoogerwerf said.

The ability to change the focus of the business and data base was possible because of the relational nature of the data base. The structure of a relational data base is not fixed when the data base is created.

Connections between data items in a relational structure are "soft" pointers (key items) rather than "hard" pointers (record addresses). Data items are located by tracing them through logically related items, no matter where they are located in the data base. This allows data to be reorganized without affecting the way it is accessed by application programs, Hoogerwerf noted.

In the case of General Telephone, the change in business needs required several types of changes to the data base. One change was in geographic location as operating divisions were reorganized into functional regions. Another was the new relationship of telephone instruments to the rest of the data base. General Telephone was able to implement all of these changes without extensive revisions to its applications software, Hoogerwerf said.



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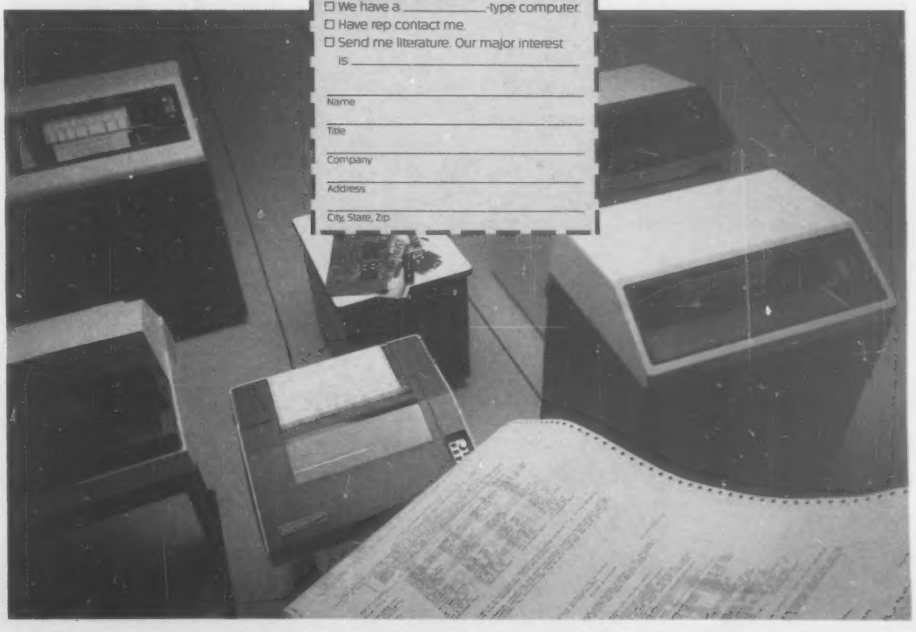


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Bank Goes Down OA Path to Hike

SAN FRANCISCO — Crocker National Bank's quest for a multiuser computer system was prompted by the same initial force that sends other corporations down the office automation path — a desire for increased productivity. But, whereas many companies have concentrated on increasing the output of their clerical support functions, Crocker's main focus was to enhance the performance of its professional and managerial staff.

Specifically, as the banking business becomes increasingly complex and competitive, it was important that Crocker's staff bring the resources of the computer to bear on unstructured tasks such as analysis, planning and control. The use of computers in the support of managerial and staff functions allows better decisions faster, the translation of decisions into actions sooner, the ability to offer new and better services to customers and the ability to exercise closer and broader control over operations.

On a practical level, account managers can increase their field service schedules as administrative details are executed more efficiently, as well as have more time to seek out new business. Clients also benefit because a properly organized computer system can facilitate more rapid credit approvals and rejections.

Initial Survey

An initial survey of the needs of prospective users within the Crocker organization revealed a combination of applications — word processing, data base management, budgeting, modeling and communications — that mandated selection of a high-end, multiuser, multitasking system.

Before beginning a search for the right system to suit its needs, Crocker decided to design a pilot program to introduce and evaluate the chosen system under controlled conditions. There were several advantages to this approach.

A key benefit was that the organization could gain experience in introducing the system, training personnel and establishing support procedures, greatly reducing the time required for other personnel to learn the system during future corporatewide installations.

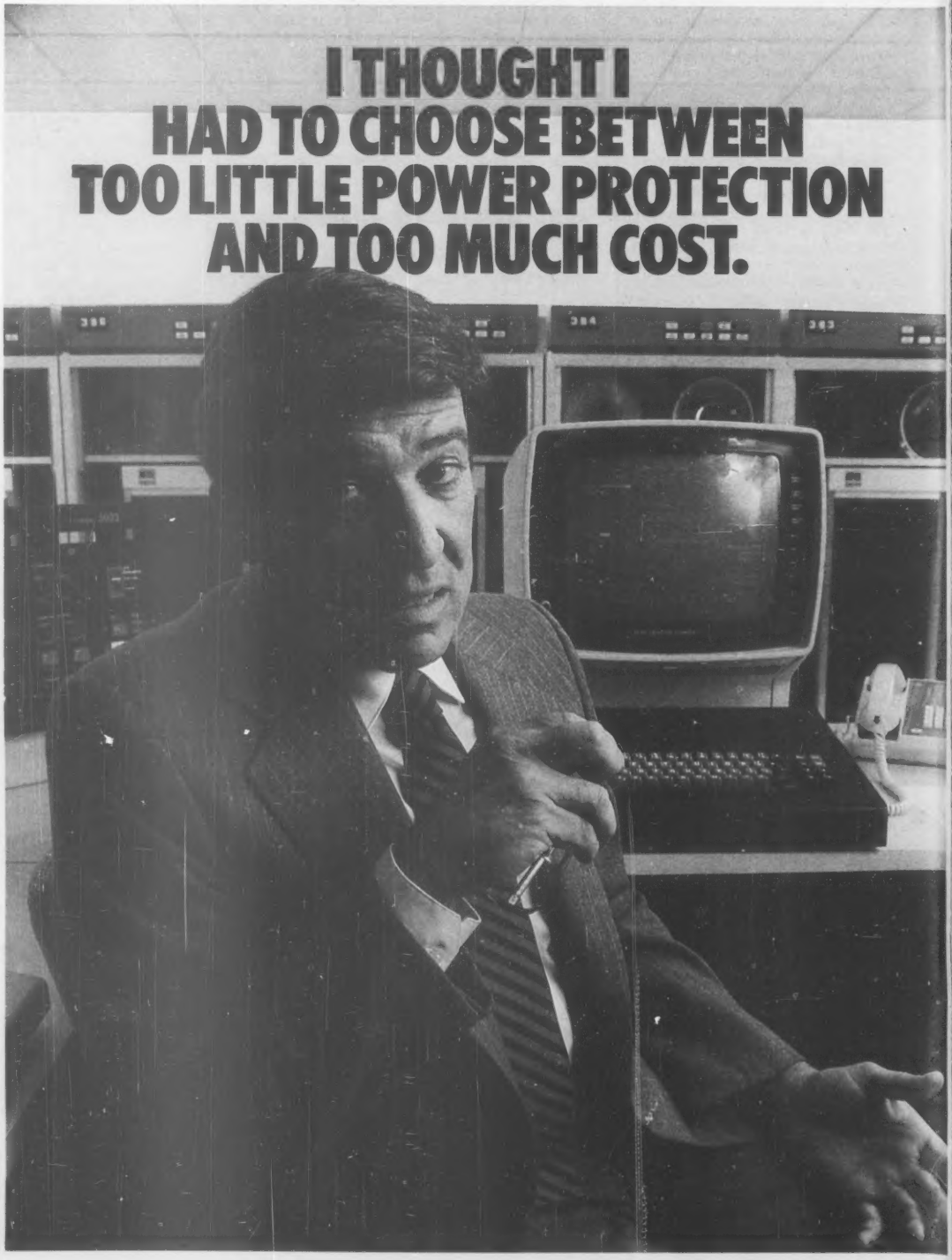
Using a pilot group to experiment with a new system also minimizes the risk of a failure or of new technology causing widespread confusion and bogging down daily operations. It also allows an organization to measure carefully the results of the system's introduction on the daily routine so that quantitative along with qualitative results can be assessed in making a final evaluation of the system.

Crocker selected its pilot sites on the basis of probability of successful installation, functional similarity to other areas of the bank and potential for a worthwhile return on its investment.

The sites selected were all part of the Metro Banking North Group of the Business Banking Division, responsible for the development and administration of banking services to mid-market commercial enterprises in northern California. The staff members selected for the pilot study were all high-interest/high-aptitude personnel, and their functional activities, from secretarial to managerial, were studied to obtain a precomputer performance baseline.

With sites and personnel for the pilot study selected, a task force of the Metro group decided the relative priorities of system requirements previously laid down by an office analysis study.

The proposed computer system would be required to address the tickler system used by account officers and account administrators for the administration of current accounts, turnaround time for text production, profit planning and tracking, marketing information and tickler system for follow-up on new business prospects, fee billing and collection, internal reporting and communications, access to account status and relationship profitability analysis and



Productivity of Professional Staff

credit analysis on loan requests.

Once the pilot program was set up, Crocker's attention turned to the actual search for the computer system. Requests for proposals were sent to 38 companies, with 21 responding by the deadline, including IBM, Digital Equipment Corp. and Burroughs Corp.

Architectures ranged from a central minicomputer host connected to an assortment of word processors, microcomputers and terminals to a distributed microcomputer system connected by local-area networks, on the other. Costs ranged from $200,000 to $500,000.

Based on the Metro group's system requirements, the geographical dispersion of the group and the project's staffing resources, several factors were considered when judging the various proposals.

A distributed approach was preferred to host-based systems because it did not require high-speed lease lines, depend on a single processor, require special environmental conditions such as air conditioning or special operating personnel or experience severe system degradation as the number of users increased.

A standard operating system was preferred because of the greater flexibility in adding application software and customizing the system to suit Crocker's particular needs. The bank also insisted on easy-to-learn, easy-to-use software that included menus, on-screen Help facilities and well written documentation. It wanted to avoid the necessity of constantly retraining personnel or reentering data because of complex, awkward-to-handle software.

Vendors Selected

From the initial pool of 21, five vendors were selected for additional discussions, and then demonstrations and information for further analysis were requested for three systems.

A benchmark test was designed to simulate the typical activities that would be performed on the system, and the final benchmark competition was held between two manufacturers. In addition to the objective competition, Crocker's evaluation team, comprised of five Metro staff members and the project manager, spent an afternoon gaining hands-on experience with both systems side by side.

The Fortune Systems Corp. 32:16 microcomputer was the unanimous choice of the evaluation team. Its ease of use and detachable keyboard were strong points in its favor. While the pilot program will continue through Dec. 1, it is possible to make some general characterizations about the bank's experience with the 32:16 microcomputer.

Best System

"While it is not, as some might claim, the greatest thing since sliced bread, it is by far the best computer system that would solve our needs and still be within an acceptable price range. The bottom line is that much more front-end training and system administration would be required to reach the same level of productivity we've now attained if we were operating on a larger host such as a DEC VAX-11, Wang Laboratories, Inc.'s OIS or IBM's Series/I," said Kurt Schweer, Crocker's vice-president and manager of advanced office systems.

"The documentation has been excellent. Our technician, who didn't know the Fortune machine or its Unix operating system, was able to connect all peripheral devices, load all software and set up accounts on our system in a single afternoon by simply following instructions in the manual," Schweer added.

Another benefit has been Fortune's "one-phone-number-for-all-problems" approach to field support. For example, Crocker once had a problem with the system not printing reports from the Multiplan spreadsheet program. A call to Fortune established that the cause was a recently uncovered software error that the bank was able to fix itself.



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Superintendent Calls for DP Ethics Curriculum

RED BANK, N.J. — Spurred by what she terms as the "unanticipated negative, even frightening consequences" of computer use — evidenced by the recent attacks of hackers on private computer systems — the superintendent of schools here has drawn together a committee of teachers and local professionals to draft a DP ethics curriculum for the school system's 1,000 students.

Joan D. Abrams, superintendent of the school system here, said the ethics component of the system's computer literacy program will stress the responsibilities students take on as they increase their technical knowledge. Abrams hopes that the ethics curriculum, which will be jointly taught in computer and social studies courses, will be ready by November for students in grades five through eight and by next year, for grades one through four.

"I see this as another way of teaching children the responsibilities of citizenship and the consequences of their actions," Abrams said. "While a computer itself may be value-free, it takes on human values when a human being uses it.

"These hackers see what they're doing as only fun; they don't understand the significance of their actions. It's nice to be one up on other people technically, but that knowledge carries with it certain responsibilities," Abrams said.

The ethics curriculum is expected to focus on broad issues of morality in the early grades and become more specific in the upper grades, with emphasis on topics such as program piracy and unauthorized access of private computer systems.

Using Apple Computer, Inc.'s Apple IIe computers, the school system currently offers courses in DP literacy.

Deltak Series Covers OA Systems

NAPERVILLE, Ill. — A five-course multimedia training series covering the complete development cycle of office automation systems has been announced here by Deltak, Inc.

Series 62-2XX, "Designing Office Automation Systems," is based on the experience and research of the Diebold Group, Inc., Deltak said. It is intended for people introducing office automation into their organizations or those wanting to improve the OA planning, design and implementation methodologies they presently use.

Fifteen to 20 hours are required to complete the five courses: "Planning for OA," "Initiating the OA Strategic Plan," "Completing the OA Strategic Plan," "Implementing OA" and "OA Technological Considerations."

The series was designed for system designers, users, office automation specialists, directors and first-line managers who need a specific methodology for office automation design, the vendor said.

Courses are available for an average rental of $50 to $125 per course, per month, depending on volume.

In addition to this, courses are available for purchase at $1,750 each.

Further information on the series is available from Deltak, which is located at East-West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

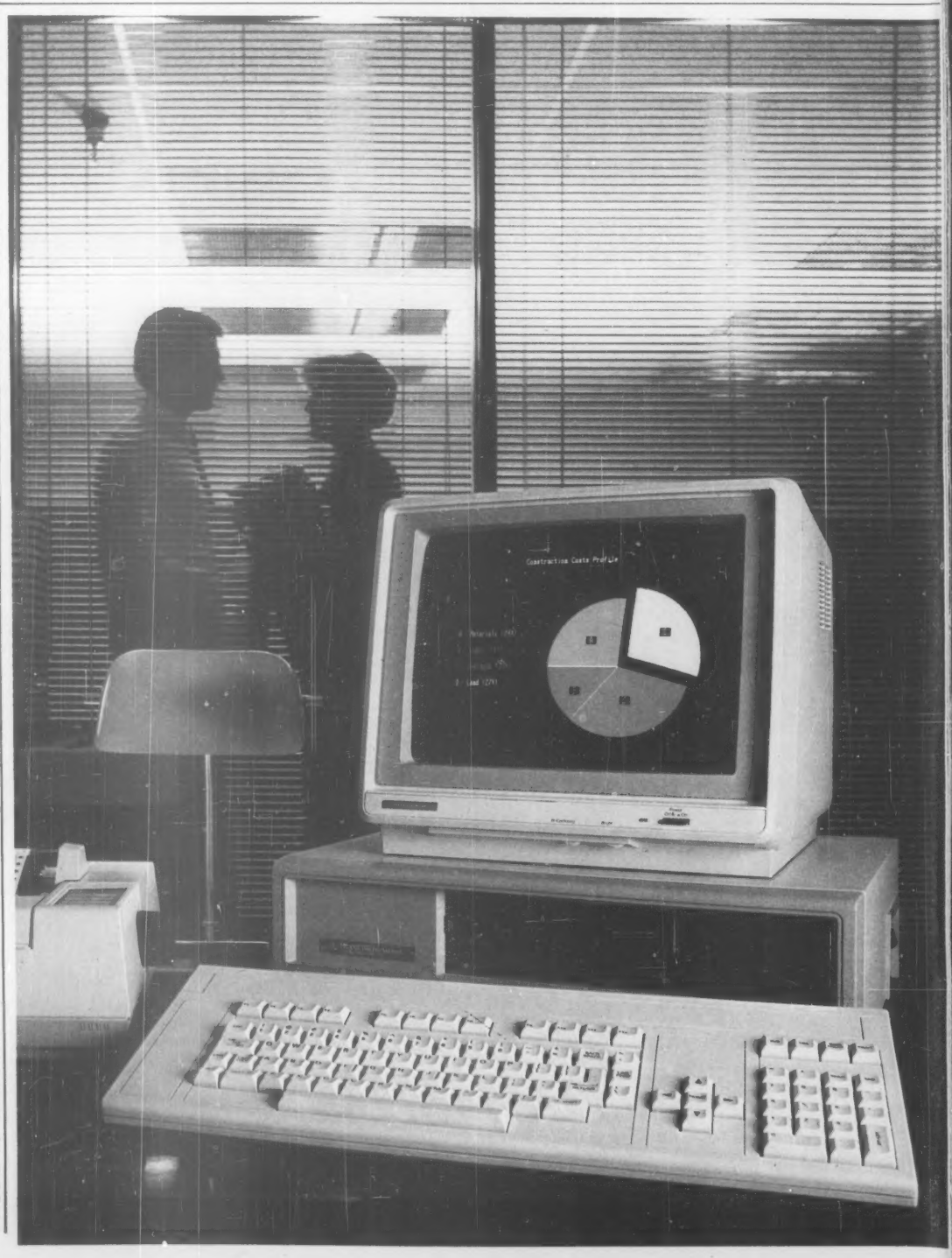
Call For Papers

SYNTOPICAN XII ADVISORY COMMITTEE, Chicago, July 17-21, 1984.

The theme for Syntopican XII is "Communicating Information: People, Systems, Networks." Professional papers are requested; topics should relate to the theme in either a technical or managerial sense.

The deadline for receipt of completed papers is Nov. 30. All submissions will be received and considered by the Syntopican Advisory Committee for possible presentation at the conference or for publication in the annual book *Papers and Proceedings*. Those selected will be notified as soon as possible.

To obtain a copy of "Guidelines for Preparation of Professional Papers," to propose a paper topic or to obtain additional information, contact James F. Casale, Director of Conference Planning, Alsp, 1015 N. York Road, Willow Grove, Pa. 19909.



Is It a Minicomputer or a Microcomputer?

By Jim Lowe
Special to CW‡

When the term "minicomputer" was coined several years ago, it connoted a computer that was something less than a mainframe.

Manufacturers of this new breed of system were forced to be more particular than their mainframe counterparts about what markets they entered their products into because their machines were smaller in both capacity and capability. But because the minicomputer's capacity and capability have increased over the past couple of years, the term "mini" is now relevant only to the machine's size.

What has made the word "mini" misleading is the discovery of the integrated chip. With this discovery "core" became "memory," and the size of the computer became smaller.

Given these developments, the word "mini" could be applied today to some mainframes. In time, one suspects, the so-called micros will intrude into the area once occupied by minicomputers. Once this happens, "micro" will also take on a new meaning.

The computer industry has always had a way of convincing companies they needed more computing capability and, therefore, needed to upgrade their systems — systems that, in most cases, were doing an adequate job.

This happened when IBM convinced the business industry the old IBM 1401 and 1410 were outdated, and business needed to move up to the 360. At that time many companies had not completed their programming efforts, were not properly introduced to systems that required a great deal of sophistication, did not have programmers trained on the 360 and, perhaps worst of all, had no upward path between machines other than emulation.

Emulation Trap

Many companies fell into this emulation trap and consequently never received any value by upgrading to the 360. Many data processing firms, including the one I work for today, are still trying to recover from this trick IBM played on the industry.

My job here was to bring the company from the Dark Ages of punch-card-related systems emulating the 360 and running under DOS operating software to a modern-day operation based around Hewlett-Packard Co.'s HP 3000 Series 64 and two HP 3000 Series 44 minicomputers.

The minis made it possible to use CRT terminals for on-line processing and data base concepts for on-line querying and updating. This configuration allowed the company to design screens that are readily understandable and useful and to process files and records at a high rate of speed.

Computer manufacturers are much wiser today. All programs they design for one model can run on an upgraded version without any software modifications. With this type of dedication to their systems, minicomputer manufacturers should be around for a long time to come.

Lowe is information systems director for A.C. Transit in Oakland, Calif.

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As Micro Capabilities Improve

More Firms Seen Turning to Micros

ST. LOUIS — More and more companies, small and large, are turning to microcomputers to run their businesses. As the micro's capabilities improve, businesses are seeking out these relatively inexpensive pieces of hardware to solve their problems.

Some computer consultants, however, recommend minis to the majority of their small-business clients. But the recommendations depend on the needs of the individual small — 19 employees or less — business. Because these businesses are entrepreneurial in nature, they are reluctant to commit themselves to anything new, especially something as mysterious as a computer.

Each consultant interviewed has his own hand-holding method to soothe frightened first-time-user clients.

"Basically, I am just very open and honest and try to answer all their questions. As their knowledge of computers improves, their fears seem to dissolve," said Bonnie Moran, owner of Compuquest, a computer consulting firm in Oakland, Calif.

"The biggest fear seems to be what the computer is going to do to their businesses," explained Robert Gershon, president of Robert Gershon & Associates, Deerfield, Ill.

"It's a lot like keeping up with the Joneses. They just reach a point in their businesses where they can no longer operate without a computer and so do their competitors," according to Gershon.

Two Stages

Bert Robinson of RRA Consulting Services, Inc. of New York explained the fear in two stages.

First, there is the decision to buy a computer and second, there is the installation process, whereby the computer is actually placed in the business.

"I take all the important decisions away from them. I do the work and tell them step by step what will be going on. The decision can then be made more naturally because the pressure has been eliminated," Robinson said.

Consultant's Move

Once the decision to buy a computer has been made by a small-business owner, the computer consultant will take several steps:

- He will determine the business' major needs — accounting, word processing and the like.
- He will determine the software and hardware necessary to fulfill these needs.
- He will negotiate contracts with hardware and software vendors.
- He will install and program the system.
- He will train his client and employees to use the computer.
- He will be available, for at least the next few months, to answer any questions about the system and to make repairs if needed.

The consultant's major obstacle lies in the second step of the process — deciding which hardware his client requires. A lot depends upon his definition of "minicomputer" and "microcomputer."

Gershon said that the difference is simple. "The mini is a multiuser system, while the micro is a single-user system," he said.

But Robinson thought the real difference is cost, the mini being the more expensive of the two, but offering a lot more capabilities.

"The difference between a mini and a micro is about $30,000 [the mini being the more expensive]," Moran said.

The consultants interviewed agreed that the primary advantage to a micro is that it is less expensive. A small-business executive needs these extra savings because his overhead is usually high and his disposable income is low.

"I recommend to my clients that they really look at micros before they make a decision to buy a mini," Moran said. Micros are easier to find because they can be bought at a computer store, and a lot of them have multiterminal capabilities, much like the minis," she continued.

Another advantage to micros is training, Robinson said. "Implementation time is short because it is much easier to train yourself to use a micro," he added.

Gershon disagreed, however, claiming it is a misconception that it is relatively easy for a layman to teach himself to use a microcomputer.

"You can't get the proper training from a vendor or a manual. A first-time user always needs a consultant," Gershon said.

"Also, if something goes wrong with a micro, you have to bring it into the store to be fixed. When you purchase a mini, a vendor will come to you to fix the problem," he continued.

Robinson claimed that micros were at a disadvantage to minis in three major areas. First, the client finds it difficult to select the proper micro software packages when he shops in the store alone. He may not really know what the best package is for him, he said.

Second, micros do not have the networking capabilities of the minis to tie into other systems. Third, the peripheral, data processing and communications capabilities are not as strong in a micro.

Moran disagreed with both her colleagues. "There's such a broad range of micros with so many capabilities on the market today that I can't say there is a real difference between the mini and micro for a small company with uncomplicated business needs," she explained.

Unlike Moran, both Robinson and Gershon said that the mini is still the best computer for today's small business.

There are five primary advantages to the mini, according to Gershon: It is better for clerical support systems and has multiuser capabilities, vendor-supplied training, on-site maintenance and more flexible information storage.

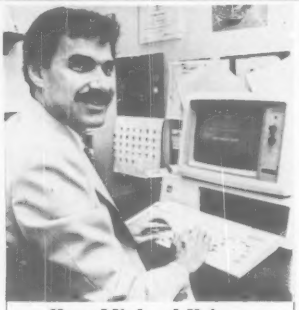
"I've yet to see a small business [two- to three-member office] that can run on a micro only," Gershon said.

Robinson agreed, saying, "The only disadvantage to a mini is cost. Everything else is advantageous to the small business.

"The mini's expansion capabilities are very important to a small business because the computer can grow with the company."

Unlike her fellow consultants, Moran perceived several disadvantages to minis besides cost.

"The mini is still physically larger than a micro and in some cases requires changing the physical environment of the office — special flooring, air conditioning and so forth. Also, it is much easier to purchase a micro because there are so many available in the stores today."



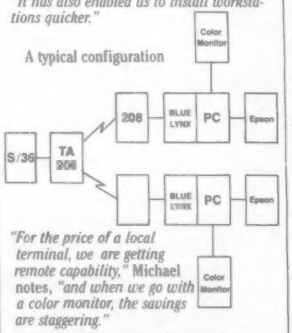
How Michael Krieger "dumped the dump"

Michael Krieger is DP manager of *Augustus Fashions, Inc.*, a leading manufacturer of quality men's and women's clothing. His responsibilities include providing efficient communications between the firm's Manhattan factory and two showrooms, and its warehouses on Long Island and in New Jersey.

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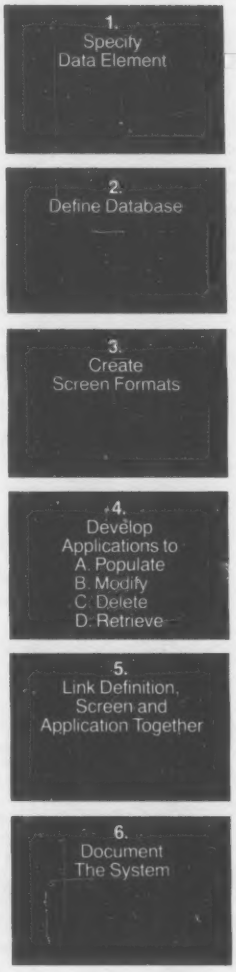
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Conference Attendees Envision Decision Support

By Paul Gillin
CW Staff

CHICAGO — Users went to this year's Software/Expo with expectations of bigger 1984 budgets and visions of decision support dancing in their heads.

Asked how they expected next year's budgets to compare with 1983, several of the 10 users interviewed on the exposition floor here at the conference recently indicated that increases would be in the range of 25%, compared with 10% to 15% hikes granted this year.

However, several attendees indicated that their budgets are likely to remain flat or increase only slightly over 1983.

Info Systems Rate High

Most managers who had money to spend at Software/Expo said executive information systems rated high on their wish lists. Manufacturing software was also a popular item in this industry-intensive region. And several users said they were casually checking out micro-mainframe links.

For Jerome Murray, director of management information systems (MIS) at Rose Packing Co. in Barrington, Ill., "trying to find a way to focus management's quest for profit on specific means and then providing them with [information systems] support" was a major consideration.

Murray is seeking an environment in which computational tasks will be replaced by decision support. "We're trying to develop a situation where management doesn't just ask how many widgets we sold, but asks questions that will make that question obsolete," Murray explained.

Executive Decision Support

Executive decision support was also on the mind of John Harodecki, director of data processing for Ozark Air Lines in St. Louis. "We're looking for something executives in the corporation can use for financial planning, something they can use without getting into the computer." A mainframe spreadsheet was on his shopping list.

With a growing shop and a number of micro users around the company, Kevin Oswald, information systems manager at Peavey Co. in Chicago, was looking for micro-mainframe software.

He said a real-time link is not as important as IBM 3270 emulation in tying in to the corporate IBM 3083. Oswald was also looking for data base management software for the IBM Personal Computer.

Several users were looking to automate further their manufacturing operations. "We're looking for order processing and in particular a total solution for manufacturing, but it's just not here yet," said William Keonig, MIS manager at Federal Mogul Corp.'s Ball & Roller Bearing Group in Detroit.

"We want a system to handle the way we do business. We shouldn't have to change the way we do business to accommodate our software," Keonig maintained.

Looking for Alternative

Inventory control, shop floor control, scheduling and eventually materials requirements planning were on the wish list of Jack Dalgleish, data processing manager at Dover Corp.'s Rotary Lift Division in Madison, Ind. Having recently converted from an IBM System/3 to a System/34, Dalgleish was looking for an alternative to IBM's Mapics.

Several other users said that 1984 would be the year of conversion in their installations. Lon Fornelli, director of MIS at GRI Corp. in Chicago, expects his budget to be 25% higher next year in preparation for conversion from Honeywell, Inc. to IBM hardware.

"A majority of people feel more comfortable with IBM, especially the president," he said. A mail order processing package was also on his software wish list.

Ozark Air Lines is planning a conversion to an IBM 3083 mainframe from its current 4341 and a major software conversion from DOS/VSE to MVS next year, Harodecki said. However, the DP budget is expected to rise by less than 5%.

A good data base manager and application generator will probably drive the hardware conversion at Intervarsity Press, Inc. in Downers Grove, Ill.

With a programming staff of two, the company "needs an application generator because it would be nice to do many new things without new people," said Steven Palmer, DP manager. His shop currently runs a Data General Corp. Nova minicomputer, but is interested "in finding a faster machine, something with more disk storage."

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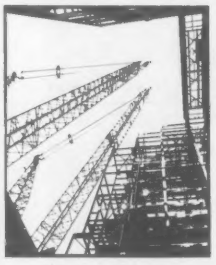
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Tech Should Take Back Seat to User Issues

Exec Urges Shifting Focus in DBMS Purchase

By Paul Gillin
CW Staff

CHICAGO — Whereas the criteria for selecting a data base management system (DBMS) were 90% technical as recently as three years ago, the emphasis today must be on solving specific problems, with technology taking a back seat to user issues. DP managers must also deal with the ubiquitous concern of whether to put DBMS on microcomputers rather than on mainframes.

That was the thrust of a presentation by J. Chris Wood of National Management Systems Ltd. of Alexandria, Va., at the Software/Expo conference held here recently.

Wood said that technical issues should constitute "no more than 30%" of the DBMS selection criteria in business today. However, many managers continue to rely on bells and whistles to make this expensive decision, he said.

"A DBMS is not everything to all people, and you can't find the perfect package," he said. "The question is how to find the best package for you."

When you boil it down, "99 out of 100 users want a DBMS basically for one application," said Wood, a former Cullinet Software, Inc. salesman with more than 10 years of data base experience. "First we should come up with how big this problem is: gigabytes or megabytes, batch or on-line?"

Choosing a batch vs. an on-line DBMS is a crucial and expensive decision, Wood said. "Think very seriously about the question of on-line update because it's very expensive," he noted. "Batch is cheap, but you've lost the ability to get at that information quickly. Whether you need a decision now or can wait until the next morning is a big consideration."

Often-Overlooked Factor

Another often-overlooked factor is ease of update, Wood said. Industries that are subject to government policies or frequent price and volume changes are better off with a flexible DBMS. "If you're controlled by any kind of law, you should seriously consider the static vs. dynamic question," he said.

For example, changing a field or record length can be extremely difficult with hierarchical or network models, he said. Relational DBMS are ideally suited for on-line access and modification but can slow down during times of heavy use. However, falling hardware prices and rising people prices are making the relational alternative more attractive, he indicated.

Among the technical issues to be considered are the scope of the data dictionary; access methods ("I don't think anybody has to process in a sequence any more," he said); interfaces to existing report writers and other utilities; and security and recovery provisions. "There's no limit to how much you can spend on this [last factor]," he said, "so you have to make a trade-off. You have to ask what would happen if you lost an hour's worth of work forever. How important is recovery?"

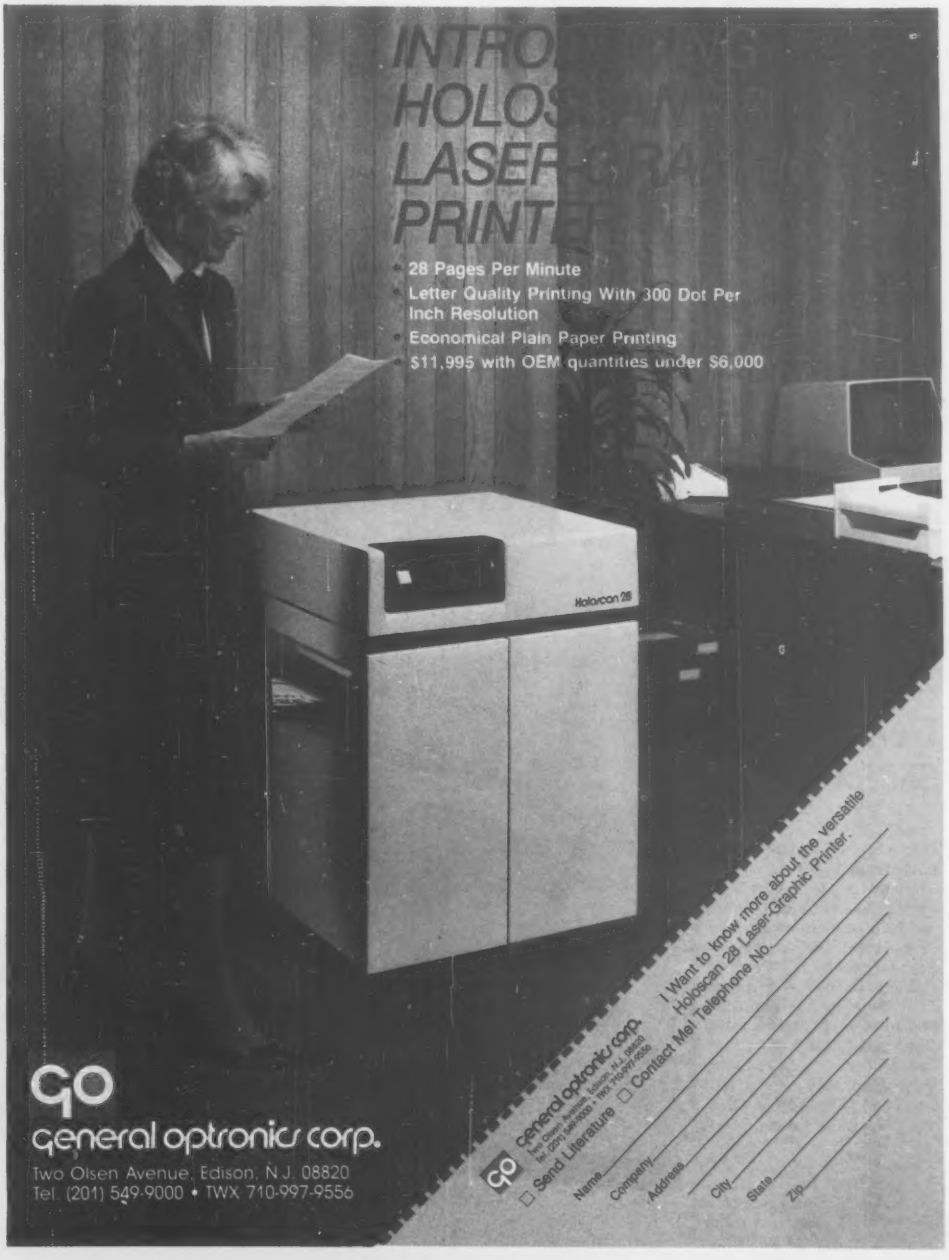
Ease of use is an increasingly vital area that "people don't look at very hard," he noted. DBMS users include data base designers, application designers, systems integrators and enhancers, programmers, end users and a category he called "sophisticated end users." Their needs are all different, and choosing a DBMS involves balancing their wishes with the problem the software is intended to solve.

Data base designers need a data dictionary, automated tools, statistical capabilities and graphics, he said. Application designers need a set of tools for mapping the application problem, prototyping facilities and products that eliminate as much coding as possible. "We want tools to get things up quickly with minimal effort, and I don't care if it's inefficient," he said.

Systems integrators and enhancers who make changes to existing software need a flexible DBMS structure. In this case, "systems with physical pointers are extremely difficult to enhance because you have to unload and reload the entire data base," Wood said. Conversely, "Here's where relational and non-structured systems shine," he stated. "If you add a field to a record it takes five seconds. With [IBM's] IMS and [Cullinet Software's] IDMS, you've got reload problems."

Sophisticated end users "love to prototype, get at some data and do some little reports," he said. They want report writers, ad hoc query languages and English-language programming languages. Most end users, however, want simple, menu-driven formats. "If they have to hit more than three keys to do something, they think it's a bad system," Wood noted.

Microcomputer DBMS have sparked a lot of interest as an alternative to an expensive mainframe package, but Wood warned that "there are tremendous problems that are just beginning to be solved."



To Foster Joint Research Ventures

Reagan Unveils R&D Antitrust Immunity Bill

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Reagan administration recently unveiled its expected legislation to provide greater antitrust protection for joint research and development ventures.

The National Productivity and Innovation Act of 1983 would, President Reagan said, eliminate the uncertainty about antitrust liability that has made corporations shy away from cooperative R&D arrangements. The bill is not as sweeping in its amendment of antitrust law as was first proposed a few months ago [CW, July 11]; it does, however, include changes to antitrust handling of intellectual property right laws in order to encourage commercialization of R&D results.

To foster joint R&D, the bill clarifies existing statutes to hold that such ventures are not by definition illegal. According to the Justice Department, this means courts could not condemn these ventures without first considering their potential benefits.

Limited Penalty

Most importantly, the bill provides that the joint ventures that have been fully disclosed to the Justice Department and the Federal Trade Commission would not be liable to treble damages or judgments for any antitrust damage they might have caused. The penalty would be limited to the exact damages plus interest.

With these provisions, the administration hopes to balance the need to foster joint R&D with the need many members of Congress feel exists to protect the business community from anticompetitive activities.

The bill would also eliminate the threat of treble damages in connection with intellectual property licensing. Here, too, courts would have to consider the pro-competitive benefits of such licensing and could not find them illegal per se. The bill also seeks to clarify the relationship between enforcement of antitrust laws and copyright and patent protection statutes.

Discussing the bill last Wednesday before the House of Representatives Judiciary Subcommittee on Monopolies and Commercial Law, Justice Department antitrust chief William F. Baxter said the bill "sends a clear message that intellectual property enhances, rather than impedes, innovation and productivity and that antitrust enforcement must be appropriately sensitive to this fact."

The subcommittee is considering a number of legislative proposals to amend antitrust law. In particular, Subcommittee Chairman Peter Rodino (D-N.J.) said Wednesday that the panel "will devote substantial attention to joint research and development." Hearings on that topic begin this week, at which time the subcommittee will receive a report from a private consultant hired to study the need for treble-damage reform.



Dema Meet Set for Oct. 17

SAN DIEGO — The Seventh Annual Conference and Equipment Exposition, sponsored by the Data Entry Management Association (Dema), has been scheduled for Oct. 17-19 at the Sheraton Harbor Island Hotel here.

Keynote addresses will be delivered by William G. Moore Jr., president and chief executive officer of Recognition Equipment, Inc., followed by Dr. Colin Fox Jr. and Dr. Tom McDade on "Socio-Technical Systems."

Registration fees are $398 for members and $454 for nonmembers. More information may be obtained from Dema through P.O. Box 3231, Stamford, Conn. 06905.

Additional CPU Saves N.Y. DGS Time, Money

By Lynn Haber
CW Staff

NEW YORK — If time is money, then the recent acquisition of an additional mainframe computer by the computer service center at the city of New York Department of General Services (DGS) is money well spent.

According to Deputy Commissioner Joseph A. Giannotti, the DGS's 1982 investment in an IBM 3081 has already paid off substantially in time and cost savings.

"The 3081 is the most reliable computer currently on the market," Giannotti said. "In comparison to its predecessor, the System 370/158, the 3081 takes less than 80% of the space and only 40% of the cooling requirements.

Operates Faster

"It also operates five times faster. Because of this, we can provide additional computing power at a reduced cost. We can now do more work for less money and in less time," Giannotti claimed.

The 370/158 system was saturated, according to the deputy commissioner, and DGS needed to do something to augment processing capability.

"Based on extensive planning and capacity analysis for present needs and projected growth, we concluded that we needed additional equipment, and the best performer for the department's requirements was the 3081," Giannotti said.

The decision to choose a higher priced system rather than a comparable product from a plug-compatible manufacturer was based on DGS's evaluation that the 3081 offered more options for future enhancements.

Just one year after installing the IBM 3081 Model D, the deputy commissioner said, the department is already studying the possibility of upgrading its current systems, which also include an IBM 3033 processor.

The IBM 3081 Model D at DGS has 16M bytes of main memory and 16 channels. An upgrade to the Model K with 32M bytes of main memory and 24 channels is being considered. According to Giannotti, the DGS will either upgrade the 3033 or replace it with another 3081.

Currently the computer service center has 500 terminals in various locations throughout the city. The DGS's investment in the 3081 has proven beneficial not only in terms of cost efficiency, but also in helping the city provide valuable services to New Yorkers.

Among some of the city agencies that utilize the resources of the computer service center are the Division of Real Property, the Law Department, the Parking Violations Bureau and the Department of Health's Vital Records Division.

According to Dave Chester of the Health Department, information is now more quickly available. "The 3081 has cut the time from 20 to 30 minutes to two to five minutes," Chester said.

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UT Board Approves Tech M.S.

AUSTIN, Texas — The System Board of Regents for the University of Texas (UT) in Tyler authorized a master of science degree in computer science during a recent meeting here. The degree is designed to prepare students to become computer science professionals.

The degree program, which must be approved before implementation by the Coordinating Board, Texas College and the University System, will offer course work in the areas of software development and methodology, computing theory, computing applications and research methods and techniques.

According to George F. Hamm, president of the university's Tyler branch, the new degree will essentially be an extension of the computer science courses presently offered through the M.S. degree program in interdisciplinary studies.

More information is available from the University of Texas System, Ash 724 201 W 7, Austin, Texas 78701.

To Reduce Reliance on State CPU

Maryland Branch Employs Micro to Draft Bills

By John Gallant
CW Staff

ANNAPOLIS, Md. — In an effort to improve response time and reduce costly reliance on the state's mainframe computer, the computer division of the Maryland Legislative Services Branch here has embraced a plan to employ a microcomputer system for a bill drafting in the upcoming legislative session.

According to Joseph Hopkins, assistant director of the computer division, the state legislature has purchased a turnkey microcomputer system developed by Data Retrieval Corp. of Milwaukee, which will link the state's IBM 3081 Model G mainframe with the microcomputer system through a local-area network.

The Data Retrieval Micro-Mainframe System includes the company's management information processing software and two Intel Corp. ITPS 86/445 transaction processors, each of which can support up to 10 terminal users.

"With this system," Hopkins said, "we can conceivably just use our mainframe for mass data storage in the future and do all our bill drafting on the micros."

Currently, each of the computer division's approximately 35 data input operators, who work on Hazeltine Corp. Espirit II terminals, utilize a local-area network to access the mainframe, which is located about a half mile away at the state comptroller's office. The computer division spends approximately $30,000 monthly to rent time on the mainframe, according to Hopkins.

Because other state agencies such as the income tax division, the payroll department and the court system also rent time, response time has been a problem.

"The main reason we purchased this system is to improve response time. We aren't the only users of the state computer. A lot of other divisions are also vying for time. Therefore, the response time is slow, sometimes as long as a minute or more. It's very frustrating. The slow response time really breaks up the rhythm of our data input people," Hopkins said.

The mainframe runs Data Retrieval's Automated Legislative Text Entry and Retrieval (Alter) software system, which allows users to input a legislator's proposed bill, revise it with amendments and language changes and update the status of the draft as it passes through both the Maryland House and Senate. The data base also contains the state's entire statutory code, which is updated when an approved bill is signed by the governor.

Work Load Reduced

The bill drafting system, which has been computerized for eight years, has reduced about three-quarters of the division's work load, Hopkins said.

According to Hopkins, the computer division plans to transfer the Alter software to the Intel transaction processors, allowing the division to perform the bill drafting and status functions without accessing the mainframe.

The division has estimated that the microcomputer system, which is scheduled to become operational in time for the January 1984 legislative session, will reduce the cost of renting time from the mainframe by 15% during the first year of operation. By gradually phasing out reliance on the mainframe, the division hopes to cut costs by up to 75% during the 1985 legislative session.

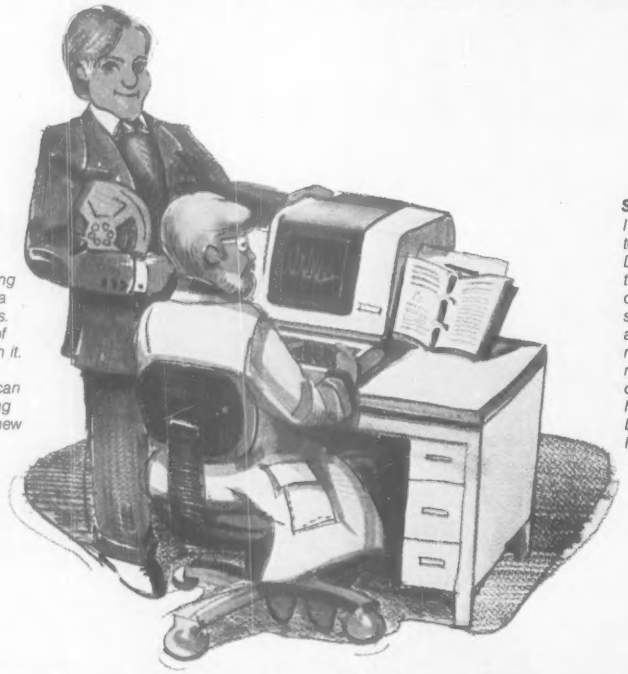
The entire package was purchased from Data Retrieval for about $230,000, according to Hopkins. Also, Intel is developing software for a local-area network that will facilitate communication between the two transaction processors, each of which is equipped with a Winchester tape drive. Each system has 84K bytes of memory, which the division plans to double by next year.

Even when the microcomputer system becomes fully operational — a process that will take at least three years, according to Hopkins — the division will not be completely independent of the state's mainframe.

Because each of the transaction processors can only support 10 terminals, additional users will continue to access the mainframe via the Intel system, he noted.

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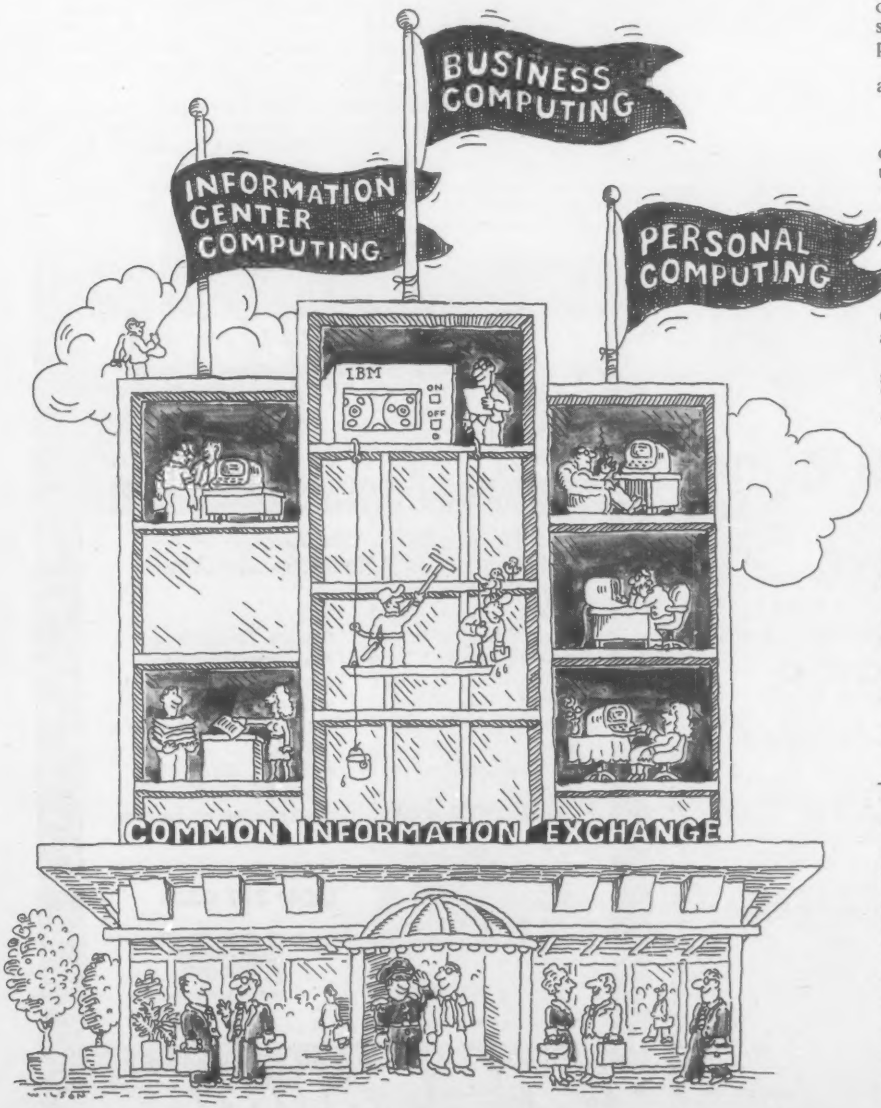
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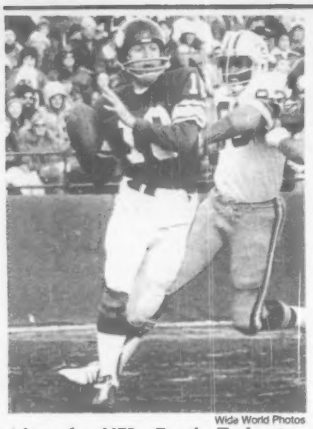
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Media Stars, Athletes Bring Computers to Living Room



Wide World Photos

After the NFL, Frank Tarkenton threw some passes for MSA . . .

By Peter Bartolik
CW Staff

Whether you call them television spokesmen, personalities or just plain stars, well-known faces with box office appeal are turning up with increasing frequency to tout computer products.

William Shatner of *Star Trek* fame beams out from a Commodore Business Machines, Inc. commercial for home computers. Bill Cosby wants everybody to get in on Texas Instruments, Inc.'s $100 rebates and free speech synthesizers. Alan Alda stitched a deal a couple of months ago to represent Atari, Inc.

The reasons for using well-known members of the entertainment professions vary with the vendors when it comes to selling to the growing retail market.

"We wanted somebody sophisticated and friendly who would appeal to our demographic target — Dick Cavett fit that mold," Stan DeVaughn of Apple Computer, Inc. recently recalled about the company's television campaign that began in 1981. Apple, which aggressively took the lead in sales of personal computers priced over $1,000, was after the "up-scale" customer who is, "as a rule, college-educated with discretionary income; somebody equally comfortable going to the theater as to a sports event," DeVaughn said.

The use of personalities does not stop at the television screen, however. And sports figures seem to be making inroads upon this sophisticated market.

Former Minnesota Viking quarterback Fran Tarkenton, now a broadcaster for ABC, was a trend setter in the mid-1970s when he appeared in newspaper ads and lectured on productivity and management for Management Science America, Inc. (MSA), the Georgia-based software company. While MSA has no formal relationship with Tarkenton at the moment, the relationship "was marvelous for us," said John Imlay, chairman of the board. The series of 12 print ads were funny and dealt with human situations, said Imlay, a close friend of the former athlete. The series, he believes, provided credibility and increased visibility for the company.

Former hockey star Bobby Orr, who returned from early retirement to become a business executive, recently was asked to join the board of directors of Cullinet Software, Inc. But there are no plans for Orr to take to the TV screen to sell software, according to a spokesman for the Westwood, Mass., company.

Orr, who is a consultant with Nabisco Brands, Inc. for sales promotion and sales motivation, may be asked to run some sessions with the software company's sales force. Reportedly a Cullinet shareholder, Orr also works as vice-president for sales with Pandick Press, Inc. in Boston. Coincidentally or not, Cullinet President Bob Goldman sits on Pandick's board, and Cullinet Chairman John Cullinane is reportedly an avid hockey fan.

Former pro football star Lance Rentzel is closer to the trenches with California-based Compucorp, Inc. In a recent interview, Rentzel said that his playing career can open doors for his new endeavors, but can also have some adverse effects (story on Page 49).

The growing acceptance of computer technology and the lure of retail revenues could result in greater emphasis on the use of personalities to sell sophisticated equipment. With an increasing consumer thirst for computer equipment and aggressive vendor battles for a share of the marketplace likely to erupt, promotional campaigns are sure to be a factor in tapping what many experts believe to be a vast potential market.

But Apple's DeVaughn sees a need to go beyond the TV spokesman and scoffs at competitors still gearing up for that aspect. Apple will not be using Cavett in its next campaign, DeVaughn said.

"Public awareness has caught up to technology," DeVaughn said. "We've gone beyond the point of making people aware about personal computers; [audiences] have to be shown what can be done with them."



. . . While Bobby Orr exchanged the NHL's boards for Cullinet's.





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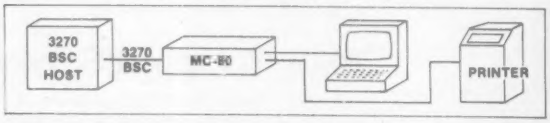
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DEC, TELEVIDEO, IBM ARE REGISTERED TRADEMARKS

Sports Fame Opens Doors In Business, But Casts Shadow

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — Lance Rentzel, a former professional athlete who now represents a computer company, found that fame earned on the playing field can open doors in a second career, but can also overshadow new accomplishments.

Rentzel played 10 years of professional football, starring as a wide receiver for the Dallas Cowboys and the Los Angeles Rams. Retired from the game in 1975, he recently was flooded with requests for personal interviews after the Associated Press reported on a computer leasing deal he had put together for his employer, Compucorp, Inc.

"I was flattered that people remembered me as a player, but I feel the focus should be on the company and what we've accomplished," Rentzel told *Computerworld* recently.

GOP Deal

Compucorp, based in Santa Monica, Calif., will provide an automated information system to the national Republican Party for use both on the floor of next year's convention and during the subsequent presidential campaign. As director of government relations for the company, Rentzel conceived and finalized the deal.

Compucorp will lease the GOP its 700 series stand-alone word processors, along with an "ambitious" networking system and new data base management software. The company's Omega Mite, a 260K-byte transportable computer, will also be included.

The system will provide everything from hotel room information for convention delegates to battle commands on the floor of the convention to campaign scheduling information. The equipment is on a reduced-rate lease plan, according to Rentzel, but is "not an out-and-out donation."

Rentzel spent several months with Compucorp "just learning the ropes" before he came up with the political campaign idea after a friend visited the White House. "The political arena had never really used this type of tool," he said, adding that it took six or seven months to cement the pact.

Employed at Compucorp for 15 months, Rentzel's football background "enabled me to know people at high levels, and that gets you in the door." Once in the room, however, "I have to deal on a normal basis. If I can't perform, I have no business being there."

A few people seem to think his football background automatically excludes business acumen, he said, even though he has a master's degree in mathematics.

"It's a slight thing I've probably had to overcome. Once I'm able to bring in a system and show them I can do more, I think I earn more credibility," he said.

Info Trends Theme of Show

TORONTO — "Info-Trends: Insights for Strategic Planning" is the theme for the 1983 Canadian Computer Show Conference to be held here at the International Centre Nov. 14-17.

The focus throughout the four-day conference will be on the impact of technological change, with special emphasis given to a global perspective and telecommunications.

The cost is $85 per day ($75 for Canadian Information Processing Society [Cips] members), and a special rate is available for individuals registering for all four days.

Further information is available from Cips, 243 College St., Toronto, Ont. M5T 2Y1.

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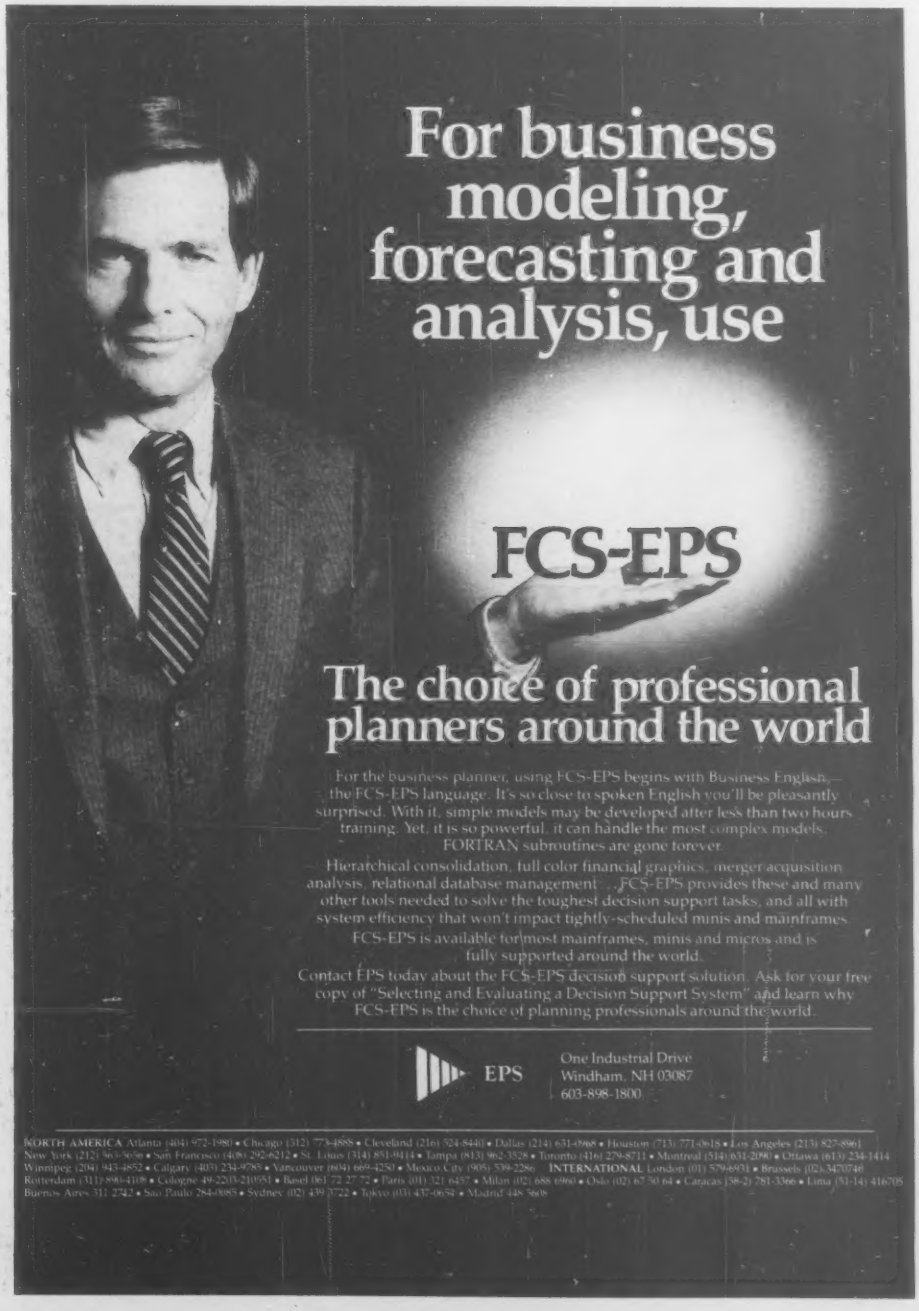
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System Enables Customers to Bank From Home

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — The need to maintain a "one-to-one relationship" with customers while adapting to technological advances has resulted in development of a direct-connect home banking system for customers of the Madison National Bank here.

With about $250 million in assets, the bank has 10 branches within its 62 sq-mile service area, but many customers live outside the district in either Maryland or Virginia. It became apparent several years ago that the bank would need a convenient form of funds transfer in order to be competitive, according to George Keyser, vice-president for data processing.

Automated teller machines (ATM) were one obvious area for development, and home banking seemed to be another likely area to consider, he said.

Madison National recently began offering its customers a system that utilizes Commodore 64 home computers from Commodore Business Machines, Inc. to access accounts and transfer funds within the bank computers; an on-line brokerage service is planned. The Home Teller service was first announced in April, and field tests with a "friendly customer base" began in June.

Those customers willing to sign a 36-month agreement, pay $15 a month and maintain a $1,000 minimum balance will be provided with Commodore's computer, 1541 floppy disk drive and modem. Customers already owning the Commodore 64 pay a reduced monthly fee.

Customers are able to phone in and have their computers communicate with a Digital Equipment Corp. PDP-11/24, which can answer up to 16 lines at a time. The PDP-11/24, which Keyser called "the traffic cop," communicates with an IBM 370/145 through a Periphonics Corp. T-Comm 80 processor. The IBM 370/145 is basically assigned to handle all on-line services, including ATMs and Home Teller, Keyser said, while an IBM 370/148 is assigned to other bank functions.

The Home Teller software used on the Commodore and the conversion software used on the PDP-11/24 were developed by Intermetrics, Inc., the Cambridge, Mass.-based software company that is a prime developer of the Ada programming language. Madison National and Intermetrics entered into "somewhere between a partnership and a joint venture" to market the software, according to Keyser.

Evaluated Systems

When a decision was made to seek a home banking system, Madison National evaluated systems "pretty much in their infancy" at banks in New York, California and Knoxville, Tenn., Keyser said. But, "No one had it designed the way we thought it should be done."

Keyser designed the system configuration, and software development was put out to bid. Intermetrics bid on the system, but eventually a joint arrangement was reached. Madison National provided the banking expertise, and Intermetrics brought the world of microcomputers "to a supermini-to-mainframe-oriented industry," he noted.

A direct-connect service was desired, according to Keyser, because it offers "the one-to-one relationship our customers are more comfortable with." It also avoids a third-party billing system that the bank could not control. Banks tend to shy away from third-party arrangements because they are "semiparanoid about third parties processing financial data," he said half jokingly.

The bank wanted control over security aspects, he added. In addition to sign-on codes and encryption, the system has a program to prevent release of data to an intruder using a random number program generator. "We've learned from ATM technology some additional security tricks," Keyser said. "We believe our security is adequate at this point."

At the moment, the system can handle up to 1,000 customers and could double that capacity with a new high-speed modem Commodore is developing, according to Keyser. Plans call for the eventual replacement of the PDP-11/24 with one of the DEC VAX family of superminicomputers. "The bottom line is the ability to buffer transactions," Keyser said.

According to Glenn Schickler, vice-president of marketing, customers can pay up to seven bills per month using the system, and that will double at a later date. Nearly 100 department stores, credit card companies and other businesses have indicated their willingness to participate. The bank is also initiating a discount brokerage service in November that will be accessible to Home Teller customers.

Madison National and Intermetrics also plan to market the software to other banks, Keyser said. Software is already under development for use with VAX computers and also for Atari Corp. home computers.

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CW 31

Not Enthusiastic About Info Net

Bankers Seen Wanting Micro Tools

WASHINGTON, D.C. — Community bankers have indicated a strong demand for microcomputer software and less enthusiasm for a national on-line information network, according to the findings of an American Bankers Association (ABA) task force. The task force will further explore the development of software.

An eight-month pilot project to examine the feasibility of building a national on-line network for community banks was conducted by a joint task force composed of representatives from the ABA's staff, the Community Bankers Council, the State Association Division and outside technical consultants.

That task force recently presented four recommendations to the ABA leadership, which is expected to accept the findings:

- The ABA should not invest large financial and human resources required to build and maintain a major electronic information delivery system for what would probably be a limited and abbreviated market.
- The organization should develop and promote microcomputer software and supportive materials to fill the needs identified by the Community Bankers Council.
- The ABA should continue to explore electronic communications opportunities.
- The reasonableness of vendor-supportive systems to create a national data base should be investigated.

ABA spokesman Dan Buser said about 180 financial organizations composing the Community Bankers Council leadership group participated in the project.

Provided Access

Buser said that bankers were provided access to Source Telecomputing Corp.'s The Source for research data and general services and to another data service for stocks and bonds information.

Bankers "liked accessing on-line services when they were free, but when we switched over and charged line costs, we found there was not much need for it," Buser said.

It became clear, he added, that bankers would rather wait for their copies of *The Wall Street Journal* to peruse the stock market and call their local travel agents to make reservations than pay an access charge to receive similar information on-line.

Community banks have acquired microcomputer equipment, the task force found, but need software pertaining to their industry that can be run on that equipment.

Bankers indicated a need for programs dealing with new savings plans, assets liability management and the like, according to Buser.

The task force will now focus attention on a Phase II project to determine the market that exists for software and to explore possible relationships between the ABA and software vendors.

"We will work with companies that might like to be involved with us," Buser said. He anticipates such an arrangement would be "a shared risk" with the ABA and vendor sharing development costs.

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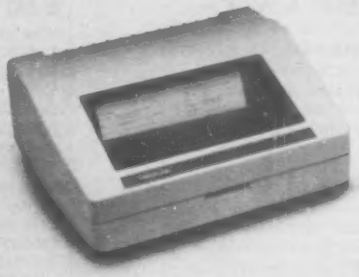
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Federal Ed Panel Pushes School Computer Use

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A special education commission recently recommended a national program, costing the federal government $1.5 billion the first year alone, to establish special math and science elementary and high schools, retrain teachers and increase student curricula in math and science, including computer science.

Declaring "America must not become an industrial dinosaur," the 20-person panel, brought together last year by the National Science Foundation (NSF), said "the nation that dramatically and boldly led the world into the age of technology is failing to provide its own children with the intellectual tools needed for the 21st century."

The panel's report, "Educating Americans for the 21st Century," was released here recently. Among other things, it called for more math and science education at all levels, from kindergarten through high school, including one semester of computer science for all students by the time they graduate from high school.

In its proposals for "sweeping and drastic changes" in precollege education, the report recommended a return to the "basics of the 21st century," which — besides reading, writing and arithmetic — should include communication and higher problem-solving skills and scientific and technological literacy.

The panel called these "the thinking tools that allow us to understand the technological world around us . . . By 1995, the nation must provide, for all its youth, a level of mathematics, science and technology education that is the finest in the world."

In the area of new information technologies, the panel noted the increasing use of computers in education. The panel went on to recommend that:

- NSF take the lead in evaluating the application of new technologies, supporting prototype demonstrations, disseminating information and supporting research on integration of educational technologies with the curriculum.
- States establish regional computer centers for teacher education and encourage the use of computers in the classroom for both teachers and administration.
- Top executives in the computer, communications and information industries develop plans to enable schools to use the technology economically and soon.
- The national and state education councils and school boards work with school districts and schools to develop plans for implementing these technologies in the classroom.

In general, the panel said: Top educational priority should go to training teachers in math, science and technology and ensuring a steady stream of such qualified teachers; earlier and more effective instruction in these subjects must be made mandatory for all students; and the school day, week and/or year must be expanded to accommodate these curriculum changes.

The report said local school districts should revise their elementary school schedules "to provide consistent and sustained attention to mathematics, science and technology" — a minimum of 60 minutes per day of math and 30 minutes per day of science in grades kindergarten to six and a full year of math and science in grades seven and eight.

Colleges and universities, the report added, should phase in higher math and science entrance requirements: four years of high school math, including a second year of algebra; course work covering probability and statistics; four years of high school science, including physics and chemistry; and one semester of computer science.

The panel also recommended the federal government encourage and partly finance establishment of "exemplary programs" in math, science and technology in every community. The panel recommended initially 1,000 such secondary schools and 1,000 such elementary schools throughout the country. The cost to the federal government, the report estimated, would be $829 million, disbursed annually at the rate of $276 million over a three-year period.

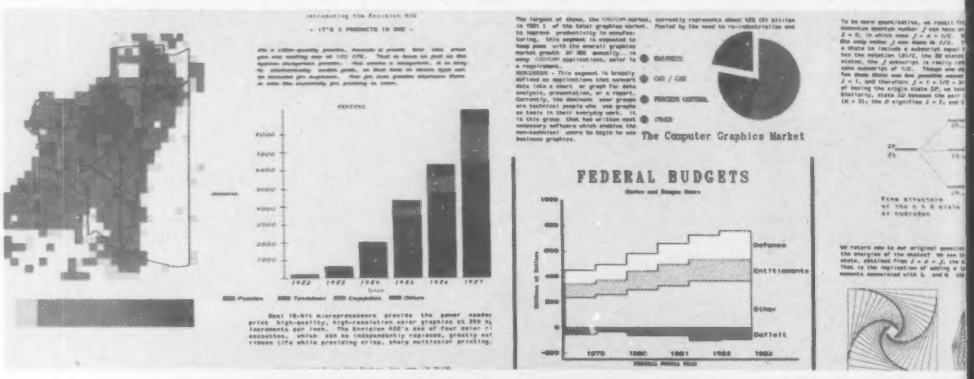
The cost to the federal government of all the programs recommended would decline from $1.5 billion the first year to $331 million in the sixth year, the report said.

ACM Course Preps for CCP

WASHINGTON, D.C. — The Association for Computing Machinery's (ACM) chapter here will present a course to help applicants for the Certificate in Computer Programming (CCP) review for the examinations.

Slated to be held at the Department of Defense Computer Institute here, the course will meet from 9 a.m. to 5 p.m. for seven Saturdays beginning Oct. 8 and concluding Dec. 3, a week before the CCP exams.

Registration is $195 before Oct. 1 and $225 after that. Information can be obtained from ACM's Washington chapter at P.O. Box 39110, Washington, D.C. 20016.



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By Offering Instruction via Electronics

'University' Enrolls Micros to Do the Teaching

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — An "electronic university," bringing together as many as 5,000 teachers and 500,000 students via personal computers by the end of 1984, was announced here recently.

The product of Telelearning Systems, Inc., San Francisco, the new educational undertaking will offer an initial 170 courses, ranging from accounting and assertiveness training to marine biology and crap shooting, available through various consumer outlets in about one month, according to the company's chairman, Ron Gordon.

The courses will be priced from $35 to $100. The system's communications package, priced from $129 to $229, depending on the personal computer used, will execute all communications protocols and logon procedures so that students can communicate with instructors with the push of one button, according to Telelearning.

The company said the package will be available for all major brands of personal computers.

Communications will be by one of three networks offered by GTE Telenet Communications Corp., Tymnet, Inc. or Uninet, Inc., respectively, and the costs will be included in the course price.

According to Gordon, students will have the choice of working interactively with their instructors or working at their own pace via electronic mail procedures. All communications will be routed through the firm's San Francisco offices, and besides the special modem, the company will provide communications diagnostics and error detection and correction software, he said.

Students and teachers will have to provide their own computers and use their own modems, Gordon said. Courses will vary in the number of lessons offered, with from five to 10 standard for the initial offerings. Like traditional school courses, the electronic courses can include reading assignments, homework and tests, he said.

Gordon, former chief executive officer of Atari, Inc., exclaiming "I am totally in love with this project," said that by "breaking down the barriers of time and distance," the electronic university will "bring education to millions and millions of people who are unable to have education."

Much Enthusiasm

The venture was announced at a Monday press conference, which featured remarks from U.S. Secretary of Education T.H. Bell and a White House official, both of whom were as enthusiastic about the project as Gordon.

"We're excited about the concept of the electronic university. I think that it couldn't have come at a more propitious time . . .

"The thrilling thing about the concept of the electronic university," Bell said, "is its flexibility and adaptability and its potential to reach all learners at all levels and to teach them where they are and individualize instruction for every student."

While Bell was careful to restrict his remarks to the use of new technology for education, a concept he has supported for a long time, James K. Coyne, head of the White House Office of Private Sector Initiatives, voiced considerable support for the Telelearning system.

Saying that the White House is interested in supporting joint ventures involving private firms and public institutions, Coyne, a former congressman, said, "This is like the first day of school for a whole generation of Americans. It's a wonderful new beginning, and we at the White House wish it well and look forward to providing it with assistance."

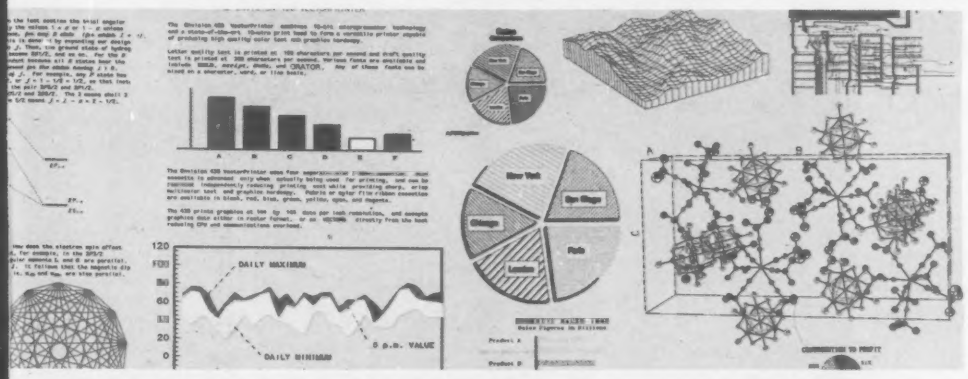
Providing further details about Telelearning's plans, company President Tom White said that besides the consumer market, the firm will be licensing its software and technology to schools, corporations and government agencies for a variety of educational programs.

By the end of 1984, he predicted, at least one million people will be taking instruction using the firm's technology.

According to the firm, a number of universities are experimenting with the firm's products to see how they can be worked into current modes of instruction. Company Chairman Gordon said he could not release the names of those schools until their negotiations with Telelearning are complete.

The firm also said the company is working with schools to gain high school and college credits for the courses.

Some of the professors who teach the electronic university courses will be working part time with Telelearning to supplement their usual income, and some will be full time, according to Gordon, who said the prices of the courses will be based on the credentials of the instructors and the number of lessons.



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College Trustees Almost Cancel Robot Course

By Peter Bartolik
CW Staff

HAVERHILL, Mass. — The fear that robotics threatens American workers' jobs almost caused the governing board of a state junior college here to reject funding for training students in the emerging technology.

Northern Essex Community College was awarded a $54,000 vocational education grant to establish a certificate course in robotics technology, but a motion to accept the funds was initially defeated by a five-to-five vote of the college trustees meeting on Sept. 7.

Trustee James Kelly reportedly argued against the program, charging that robotics is putting people out of work in several industries, such as the automobile industry.

College President John Dimitry asked the board to reconsider the motion, pointing out that 17 students had attended their first class in the program that very morning.

On the second vote the board voted seven to three to accept the grant. One trustee who changed her vote in favor, Carolyn Whittaker, reportedly stressed that she "philosophically" opposes robotics and will not vote to continue the course next year.

The program is funded by $54,000 in U.S. Department of Education funds that are awarded through the state education department. It provides for a 12-month certificate curriculum comprised of several courses focusing on hydraulics, mathematics, programmed devices and the maintenance of robotics equipment.

President Dimitry, in an interview with *Computerworld*, said the fears of trustees are justified to a degree, citing estimates that many currently furloughed auto industry workers may never be rehired. A native of Detroit himself, Dimitry said he deplores such a situation but realizes that American industry has been built on the continued development of "labor-saving devices."

The college, with a total enrollment of 8,800 students in day and evening divisions, is seeking to promote "computer literacy for everyone, whether they are robotics students or English students," Dimitry said. Some trustees believe the college has placed "too much emphasis" on high technology, he added.

That emphasis may reflect trends in local industry. The college is located in the Merrimack River valley area, which for years has suffered from dependence on the declining textile industry.

In the adjoining town of North Andover is a Western Electric plant employing more than 6,000 people; the Lowell headquarters of Wang Laboratories, Inc. is within easy commuting distance; and Haverhill itself is currently seeking federal funds that would enable Wang to build a plant there.

Despite the cool reception from some trustees, Dimitry said he hopes the course is successful and that the grant will be extended for a second and a third year. "Three years ago, some [trustees] used to tell me computers are just a passing fad — they don't tell me that anymore," he said.

Course to Cover Use of Micros In Corporations

WHEATON, Ill. — A seminar on the use of personal computers in the corporate environment is being offered to individual data centers by Personal Computer Management, Inc. (PCM) here.

A two-part seminar, the "Management Seminar on Personal Computers" begins with a two-hour overview of the reasons for the popularity of the personal computer, the applications that are being seen in the corporate community and the most frequently used software packages. The second half of the seminar is a case study that demonstrates the use and power of the personal computer and its software.

PCM founder Anthony J. Paoni conducts the seminar at client sites. It ranges in cost from $2,000 to $5,000, depending on the size and duration of the seminar. Further information is available from PCM, 1626 Orth Drive, Wheaton, Ill. 60187.

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CHICAGO — SRA, Inc., the educational publishing arm of IBM, has issued a series of 16 videotapes on new IBM products, newly released software, installation and performance.

The Technical Update Series, to be sold by subscription, was developed from an in-house educational effort at IBM, according to a spokesman for SRA. The tapes cover such topics as MVS/SP, IMS/VS and 3380 installation and performance. Ten more videotapes will be added to the series this year, the spokesman added.

Subscriptions cost $1,600 for 20 tapes in two years. Single tapes are listed at $100 from SRA, 155 N. Wacker Drive, Chicago, Ill. 60606.

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Calendar

Week of Oct. 16

Oct. 20-21, Hilton Head Island, S.C. — **Microprocessors: Management Tool**. Contact: Southern Training Corp., Suite 1030, SCN Center, Columbia, S.C. 29201.

Oct. 20-21, Minneapolis — **IMS/VS Data Communications Programming**. Contact: Kaaren Perez, Comped, 10 E. 21st St., New York, N.Y. 10010.

Oct. 20-21, Washington, D.C. — **IMS/VS Dump Reading**. Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Oct. 20-21, Chicago — **How to Use Dbase II on Your Personal Computer**. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Oct. 20-21, Washington, D.C. — **Advanced Office Automation for the 1980s**. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

Oct. 20-21, Worcester, Mass. — **CAD/CAM: Concepts, Systems and Applications**. Contact: Kathy Shaw, Office of Continuing Education/Higgins House, Worcester Polytechnic Institute, Worcester, Mass. 01609.

Oct. 20-21, Newport Beach, Calif. — **Computer Protection Seminar and Exhibits for Security and Data Processing Professionals**. Contact: Edward J. Anderson, Corporate Security Director, Vidal Sassoon, Inc., 2049 Century Park E., Los Angeles, Calif. 90067.

Oct. 22, Pittsburgh, Pa. — **Developing Effective User Manuals**. Contact: Carol Janik, Carnegie-Mellon University, Pittsburgh, Pa. 15213.

Week of Oct. 23

Oct. 23-25, Airlie, Va. — **Document-Based Optical Mass Memory Systems**. Contact: Richard D. Murray, Director of Conferences, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Oct. 23-26, Hilton Head Island, S.C. — **Facts 83: A New Look at Financial Technology**. Contact: Association of Information Managers, Facts 83, Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

Oct. 23-27, Scottsdale, Ariz. — **The 1983 Infodata National Users Meeting.** Contact: The 1983 Infodata National Users Meeting, Infodata Systems, Inc., 5205 Leesburg Pike, Falls Church, Va. 22041.

Oct. 24, New York — **MIS: The Micro Link.** The Center for Management, Baruch College, 17 Lexington Ave., Box 520, New York, N.Y. 10010.

Oct. 24, San Francisco — **Structured Systems Development.** Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24, Chicago — **Computer Planning and Acquisition Strategy.** Contact: Annex Computer Report, Suite 530, 120 E. 56th St., New York, N.Y. 10022. Also being held Oct. 26 in Atlanta and Oct. 27 in New York.

Oct. 24, New York — **IBM CICS/VS Concepts, Products and Service**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-25, Washington, D.C. — **IMS/VS Application Development Facility II**. Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Oct. 24-25, Philadelphia — **Data Communications: Advanced Concepts, Products and Service**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-25, Hartford, Conn. — **Focus Query Language for End-User Personnel**. Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Oct. 24-25, Washington, D.C. — **DBase II**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 26-27 in Baltimore.

Oct. 24-25, Los Angeles — **Vsam Performance and Tuning.** Contact: Ken Carozza, Regional Marketing Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

Oct. 24-25, New York — **Managing Projects in the Structured Environment.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-25, Washington, D.C. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 24-25, New York — **Team Management Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-25, Williamsburg, Va. — **Software Verification and Validation: Realistic Project Approaches.** Contact: Data Processing Management Association Education Foundation Seminars, Department SVV, Suite 2000, 3420 Kashiwa St., P.O. Box 3608, Torrance, Calif. 90510.

Oct. 24-25, New York — **IBM's Systems Network Architecture: A Master Plan for Teleprocessing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-25, Chicago — **Guidelines for Successful Selection, Acquisition and Operation of Microcomputer and Minicomputer Systems.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Oct. 24-25, Eugene, Ore. — **The Second Annual Pacific Northwest Computer Graphics Conference.** Contact: The Second Annual Pacific Northwest Computer Graphics Conference, 111 Susan Campbell Hall, University of Oregon, Eugene, Ore. 97403.

Oct. 24-26, Chicago — **Personal Computers: Strategies for Managing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-26, Boston — **DOS/VSE Job Control Language.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-26, New York — **The 1983 Annual Association for Computing Machinery Conference: Extending the Human Resource.** Contact: The Con-

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Calendar

ference Coordinator, Association for Computing Machinery Headquarters, 11 W. 42nd St., New York, N.Y. 10036.

Oct. 24-26, Dallas — **IMS/VS Message Format Services.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Oct. 24-26, New York — **Information Center Concepts: Organization and Implementations.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-26, Atlanta — **Basic Systems Analysis.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-26, Pittsburgh, Pa. — **Project Leadership Workshop.** Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

Oct. 24-26, New York — **Computer Generated Business Graphics for Today's Manager.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-26, Anaheim, Calif. — **Advanced Communications and Network Engineering.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-26, Washington, D.C. — **Minicomputers, Microcomputers/ Processors for Non-Electrical Engineers.** Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Oct. 24-26, San Francisco — **EDP Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-26, Washington, D.C. — **Project Leadership Laboratory.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-26, San Francisco — **Office Automation: Strategic Planning, Design and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-27, Washington, D.C. — **Computer Graphics Systems: Hardware, Software and Application.** Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Oct. 24-27, Salt Lake City, Utah — **CICS On-Line Application.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-27, Washington, D.C. — **Local Area Computer Networks.** Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Oct. 24-28, Houston — **Advanced Structured Analysis.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-28, Boston — **Systems Analysis Workshop.** Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

Oct. 24-28, Boston — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-28, Oakbrook, Ill. — **Network Performance Management.** Contact: The Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Oct. 24-28, Chicago — **DP Project Management.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Oct. 24-28, Dallas — **Structured Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Oct. 24-28 in Portland, Ore.

Oct. 24-28, Englewood Cliffs, N.J. — **MVS Systems Management.** Contact: The Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Oct. 24-28, New York — **Structured Design for Real-Time Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Oct. 24-28, Long Beach, Calif., and Oct. 24-28 in Atlanta.

Oct. 24-28, Los Angeles — **Structured Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Oct. 24-28, Indianapolis — **Project Planning and Control Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Oct. 24-28 in New York.

Oct. 24-28, Lombard, Ill. — **A Program for Professional System Analyst Development.** Contact: Shirley Cerone, Cara Corp., 611 E. Butterfield Road, Lombard, Ill. 60148.

Oct. 24-28, Long Beach, Calif. — **Ada Software Engineering.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-28, New York — **Contemporary Computer Auditing: Integrity Controls.** Contact: Marge Umlor, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

Oct. 24-28, Dallas — **CICS/VS Macro-Level Coding.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

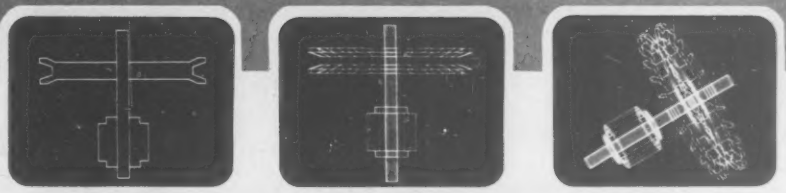
Oct. 24-28, Orlando, Fla. — **IDMS-DB Programming.** Contact: Harris Education Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

Oct. 24-28, San Francisco — **IMS Application Programming.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

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City, Waste Systems Vendor File Suits

Court Asked to Settle Performance Dispute

By Peter Bartolik
CW Staff

BIRMINGHAM, Ala. — The federal district court here has been asked to settle a performance dispute between the city government and a Missouri-based vendor of waste management systems.

Cardinal Scale Manufacturing Co. of Webb City, Mo., filed suit here late in August with a claim for $18,658 against the city of Birmingham for the unpaid balance of a contract for the Waste Information Loggings Systems (Wilogs) that Cardinal Scale installed at two city landfills. Earlier this month, the city responded with a counterclaim seeking the return of $93,291 already paid to Cardinal Scale for the systems, along with damages that could exceed $1 million.

Cardinal Scale's suit was characterized as a "defensive action" by attorney Frank McPhillips, a member of Cabanis and Johnston, the law firm representing the city.

A spokesman for Cardinal Scale said he could not comment on pending legal action and declined to describe the system installed by the company.

According to a report in *The Birmingham Post-Herald*, lawyers for Cardinal Scale said that last January the company had been promised payment if the equipment worked without incident for 30 days beyond that point, which the lawyers claimed it did. But McPhillips told *Computerworld* that "the equipment has not worked since the city purchased it back in 1981." The city, he said, is seeking to recover damages for an estimated $1 million loss of revenues during a 16-month period when landfill officials were forced to estimate waste materials being trucked in by contractors.

Additionally, the city is asking for payment of costs it will incur to remove and store the equipment.

According to McPhillips, Wilogs consists of scales hooked to computer systems that determine the amount of garbage being trucked into the landfills and print out weights and applicable fee charges. "It just never did produce accurate results," he said. "Some days [Wilogs] was just putting out nothing."

The city, McPhillips said, has also filed suit to recover a $111,949 performance surety bond from the American Casualty Co. and for damages against the installing company, Arrow Equipment Co. of Pelham, Ala.

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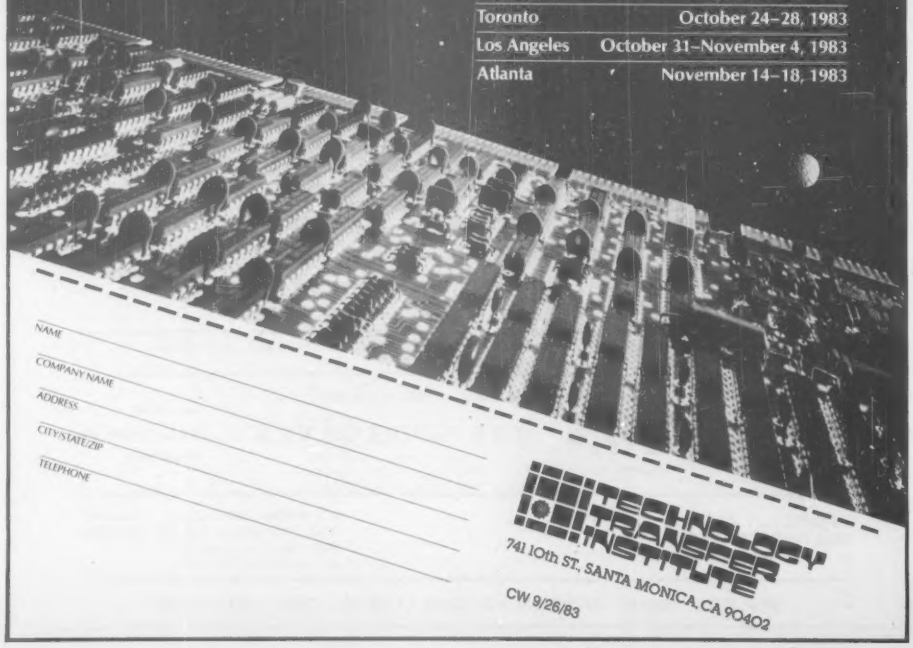
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CW 9/26/83

Phoenix Users To Meet Dec. 12 In San Francisco

CLEVELAND — The first national Phoenix Users Group meeting will be held Dec. 12 during the Data Training '83 Conference (Dec. 12-15) at the San Francisco Hilton.

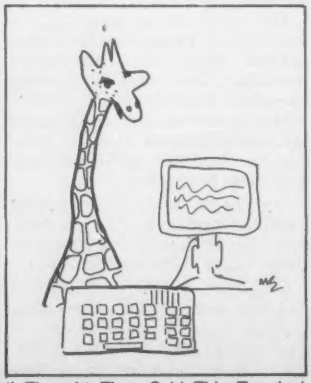
Nancy Weingarten, publisher of *Data Training*, will give the welcome address. Included in the agenda are a discussion on goals, a progress report on the product and user report presentations.

Seven regional Phoenix users groups have formed in anticipation of the national meeting. Membership in the regional users groups, recently formed in Cleveland; Columbus, Ohio; Dallas; Philadelphia; Richmond, Va.; San Francisco; and North Carolina, is open to all Phoenix users, as well as those undergoing active trials of the system, a users group spokesman said.

According to Gary Livingston, training coordinator for Blue Cross of Northeast Ohio here, the regional and national groups will operate apart from Goal Systems International, Inc., the creator and marketer of the Phoenix computer-based training system.

But, he added, the organization has been set up so that once users groups are formed, they may call upon Goal Systems for any support they need in the form of publicity, speakers, seminars and the like.

The meeting is free to current Phoenix users. Further information is available from Gary Livingston, 15903 Clifton Blvd., Lakewood, Ohio 44107.



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EDITORIAL

Trouble in Paradise

Is a personal computer industry shakeout kicking into high gear, or is the recent bloodletting at many key personal computer vendors more a sign of management inability to cope with unbridled growth?

Whatever the case, it is clear there's trouble in paradise.

Price cutting is cannibalizing once lofty profit margins, sending them dangerously close to the break-even point for some vendors. The work force at companies that just a year ago couldn't hire people fast enough has been pared 30%, 40%, 50% and more in recent months. Worst of all, the bulls of Wall Street and the venture capital market are casting an increasingly bearish eye at the personal computer vendors.

How can all this exist in an industry segment doubling each year as personal computer sales hurtle toward the $25 billion mark in 1986?

There are a number of factors, organic and self-induced, contributing to the present woes and, very likely, ultimate demise of some personal computer makers:

• **There are too many personal computer makers.** At Comdex in Las Vegas last year, over 150 manufacturers introduced microcomputer hardware. This is a markedly different situation from two years ago, when many now-troubled personal computer makers competed not against the IBMs and Digital Equipment Corp.s but largely with each other. Today, with typical retail stores stocking five or six brands of personal computer, it is simply harder getting your machine where it can be sold.

• **The mainframers have all finally jumped aboard the personal computer bandwagon.** The bad news here for the independent personal computer makers is that the mainframers are selling heavily into their installed base. Computer retailers will stock the IBM Personal Computer or DEC Professional ahead of machines from Victor Technologies, Inc. or Fortune Systems Corp. That's show biz.

• **It's very tough to compete toe to toe with IBM.** Even Apple Computer, Inc. and Hewlett-Packard Co. have recognized they're swimming in a Big Blue sea, providing Microsoft, Inc.'s MS-DOS for Apple's Lisa and HP's personal computer entree last week. Companies like Vector Graphic, Inc. have indicated they will steer clear of IBM's strengths, seeking comfort in specific market niches. The problem is, IBM is becoming ubiquitous, and niches may not allow much growth.

• **Standards for second-generation personal computer technology are expensive to develop, but no less vital to survival.** Sixteen-bit microprocessors are the rule, and internal random-access memory of 256K bytes and support of 5¼-in. Winchester disk drives don't hurt either. Try building that kind of machine (and then selling it at a profit) on a limited R&D budget.

• **It's too hard to manage 100% growth in a multi-million dollar, single-product company that began as a basement operation a few years ago.** Vendors have suffered greatly from mistakes. Computer Devices, Inc.'s IBM-compatible portable could not accommodate the 5¼-in. floppy disks on which are written over 1,000 programs for the IBM Personal Computer. And both Osborne Computer Corp. and Vector Graphic burned themselves by announcing products too far in advance of delivery dates, killing sales of their existing lines.

On the positive side, users may witness a hastening toward industry standards in the personal computer world, albeit standards dictated largely by IBM's moves.

But users will likely have less from which to choose. While this will be less confusing, there may be some very good machines and ideas that don't get to market. Given that the IBMs and DECs and Apples do not have a monopoly on innovation, this is too bad.



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LETTERS

Breaking and Entering

In the article "Hacking: Mark of Genius or Plain Theft?" [CW, Sept. 12], *Computerworld* seems to support the notion that youths that use their computers to break into computer systems and files are only playing games.

What they are really doing is called breaking and entering. The fact that they use the tools of modern technology makes no difference. They are breaking and entering just as surely as if they had picked the lock on a front door and wandered around in a building instead of wandering around electronically in computer files.

The contention of SRI International, Inc. researcher Geoffrey Goodfellow that these youths should be courted and encouraged is ridiculous. You don't leave the front door of your business or government agency open to let in anybody who is only curious.

While these hackers may be brilliant, their pranks should not be tolerated. It is only a matter of time before some data base somewhere is seriously damaged or destroyed. There have already been several cases of people using personal computers to steal money or data. Don't encourage these hackers by letting them assume their pranks are acceptable.

Bennet N. Babcock
Bethesda, Md.

Quit Coddling Hackers

I noted with interest Lynn E. Queen's letter to the editor [CW, Sept. 5].

For a data processing director to suggest that hackers be given an award for cracking a system is ridiculous.

If Queen thinks hackers should be awarded, then why doesn't she award them jobs at her installation? Since she holds the title of DP director, she probably has the authority to do her own hiring, and surely she must have a need for one or more hackers on her staff.

Just think of all the flaws they could find with her systems — it's mind-boggling.

Hackers should be treated as criminals, because that is what they are. We treat juvenile vandals harshly for what they do, and as far as I'm concerned, hackers are vandals.

Perhaps we should confiscate their microcomputers, bar them from computer usage for a year or two and fine them a couple of thousand dollars for the overall aggravation they cause.

It is about time for a few laws to curtail this behavior — not state laws, but tough federal laws that make no distinctions based on age. If you break the law, then that's it, no second chances.

Let's quit coddling these fools, and don't award them or suggest that they be awarded.

Write or call your congressman, and demand laws to put an end to the hacker.

The data processing profession does not need or even have a place for these people.

J.B. Siegfried
DP Training Instructor
Harrisburg, Pa.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

THE DATA CENTER/John P. Murray‡

The State-of-the-Art Crisis: MIS Inertia

Most of us recognize the fact that our business lives are being rapidly changed by dramatic advances in information processing technology. These changes are so rapid in fact that the phrase "state of the art" tends to become almost meaningless. That which is at the leading edge today gives way very rapidly to something more sophisticated. Everyone is being impacted by these changes, yet we in management information systems (MIS) are more affected than others. Everything seems to change so quickly, there are so many options available, that all MIS managers suffer to at least some degree from the pace of change.

It is interesting, though, that in the face of these new challenges and opportunities there are some, perhaps a large number of, installations that steadfastly refuse to move to these new information processing approaches. It is not particularly unusual to hear MIS managers state, "Even though it costs us more and it takes more time, we develop all our systems in-house because our needs are unique; we could never adapt software packages to our needs."

There is great reluctance to move to the use of a data base management system (DBMS). Lengthy studies are initiated to consider the needs of the organization and to survey various DBMS available. Often, the result of all this is (because the technology is developing so rapidly) to delay the decision in order to wait a while longer to see if something better will become available. Each new development only serves to reinforce the belief that waiting a bit longer will produce something even better. As a result, nothing gets done.

'A real problem in many MIS installations is the absence of any long-range planning that seeks to take advantage of the developing technology to serve the organization better. What is required is a plan that is linked to the strategy of the organization in order that the real advantages of this evolving technology can be identified and used, not only for MIS, but for the benefit of the entire organization.'

A real problem in many MIS installations is the absence of any long-range planning that seeks to take advantage of the developing technology to serve the organization better. What is required is a plan that is linked to the strategy of the organization in order that the real advantages of this evolving technology can be identified and used, not only for MIS, but for the benefit of the entire organization.

A random sampling of a number of MIS installations would probably show that because of this reluctance to recognize the value of new approaches, a day of reckoning is about to dawn in many of the installations. There are a great many installations that are not only unwilling to use the developing technology, but that go about the process of doing things in the same old fashion. These installations continue to build on obsolete technology because that is something with which MIS management is comfortable. Of course this is shortsighted, not only for the MIS department, but for the entire organization.

The continued building of inadequate MIS processing solutions simply exacerbates an already difficult situation. The tangle of MIS systems that do not interact, the continual creation of redundant data, the required reliance upon several old timers to keep the old systems operating are surely invitations to eventual difficulty.

Committing Time, Money

What is certain to occur sooner or later is the ordeal of the organization's senior management being forced to face up to the fact that in order to clean up the current mess, never mind moving ahead to new technology, a great deal of time and money will have to be committed to the effort.

This is not a new phenomenon; certainly all of us are aware of at least several installations that have experienced more than one reorganization.

This process appears to be cyclical: The MIS function is allowed to deteriorate, a new MIS manager is brought in and given support, progress is made (up to a point), things begin to deteriorate and so on.

Appropriate Use

The management of an MIS installation has a duty to its management to raise the question of the appropriate use of state-of-the-art processes and to recommend a plan that will make appropriate use of those processes.

This is not easy; it can be fraught with risk, yet it must be done. The issue must be really to use the new technology, not simply an attempt to gloss over some of the current problems under the guise of "moving ahead."

As information processing technology continues to develop, as competition becomes increasingly fierce, some organizations may find they have waited too long to move to the new technology, and they will not be able to afford the cost of moving to a state-of-the-art position and will be forced out of business. Other organizations may be able to pay the price, but they will find the price high indeed.

The Solution

The solution is not to wait until an almost inevitable situation develops.

The reaction of a technical "gridlock," where the cost of rebuilding the organization's old systems or of an urgent and massive movement to the new technology are the only immediate information processing options, must be avoided.

An effective, reasonable (though perhaps expensive) phased plan that will place the organization in the proper technical position and keep it there is the answer.

Murray is director of MIS for Ray-O-Vac Corp., Madison, Wis. He is responsible for worldwide MIS activities. Murray has 21 years of DP experience, 10 of which have been devoted to the management of data centers.

HUMAN CONNECTION/Jack Stone‡

Stand Aside, Bogey: Foreign Intrigue DP Style

It's been more than five years since I purchased my personal computer — we called them micros in those days — four or so since Processor Technology, the manufacturer of my Sol 20, went "belly up" and about three since my retailer, the Georgetown Computer Emporium, sold out and departed from its second-story digs atop M Street's El Caribe restaurant.

It was always fun to visit the emporium — not only to gaze longingly upon some new shiny machine, but also to inhale the gentle odors emanating from the paella preparation underfoot. Perhaps it was this experience that threw my fantasies about foreign travel into high gear: I saw myself in the role of a worldwide correspondent for *Computerworld*, outfitted in a '40s fedora and slightly worn trenchcoat ala Casablanca's Bogart, but terribly modern.

Indeed, I was carrying in a black leather camera case, a battery-driven, intelligent terminal that allowed me to prepare sensitive, stirring prose in an off-line manner and dump it into a modem for electronic delivery to CW headquarters. I even dreamt up a name change for my column — Have Computer Will Travel.

Met Needs, Capabilities

Well, I never had the nerve to offer such an idea to the editor, expecting little more than a few guffaws in response to such novelty; besides, at the time, no such terminal existed. So I had to satisfy myself with the Sol which, other than packaging, really met my needs and capabilities: trivial word processor software; toy-like file manager; a very powerful somebody-or-other's Soft Basic that I couldn't understand or use but that impressed my friends; and Target, an antique videogame that kept the kids occupied. Also, I loved to show off the genuine walnut trim and the throbbing Mediterranean blue accent panels.

And the price wasn't all that bad, not in that era anyway. It set me back a little more than $5,000, including a Diablo Systems, Inc. Diablo printer that never failed until I announced during a lecture that it had never failed and went home that evening and it failed.

I've put about four more into it over the years for software, upgrades and disk replacements — my genius youngest kid blew out the drives when he plugged a shorted lamp into my power panel.

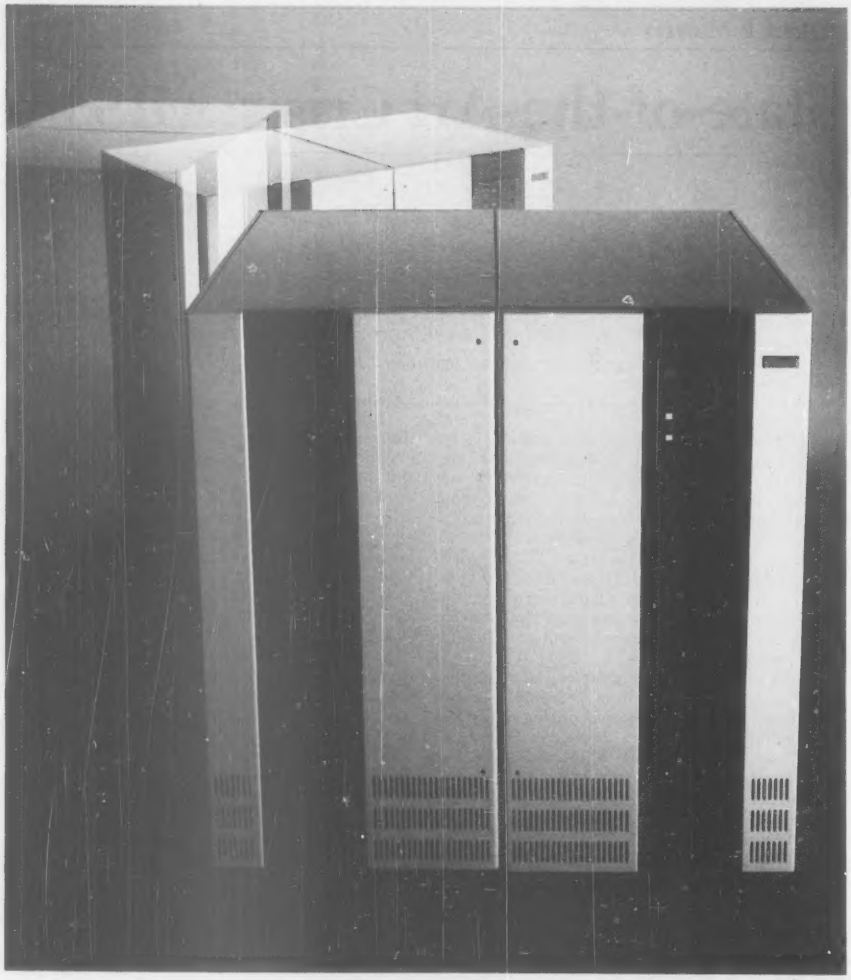
Traveling System

The system weighed in at about 100 lb, but was organized into components that were separately transportable and connectable through cables. I've hauled it just about everywhere, motoring with it resting comfortably in the trunk through much of the U.S. I have even run the machine on my boat using a diesel generator for power, but temporarily discontinued this configuration when my genius second son forgot to close the forward deck hatch and the system was caught in a summer squall. (The repairman couldn't understand how a cake of salt came to grow on my motherboard, and my nervous response was "Guess they don't make 'em like they use to.")

My first shot at foreign travel with my machine didn't take place until this past fall after feeling the first shudder from a northeaster's chill. I rather enjoyed the concept of driving to Mexico and wallowing round in tropical sunshine on the white sands of a remote Pacific beach for an indefinite number of weeks while writing away during the evenings on my beloved machine and released from huddling around a radiator for the duration of yet another Washington, D.C., winter freeze-up. So I packed the Sol, along with the trench coat, and wisked off to the border with friend and offspring.

Everything went perfectly up until, but not including, the border crossing when the Mexican "federales" kicked us right out of the country, alleging that the computer would attract bandits or unscrupulous police. I was forced to store the machine in Laredo, Texas, before recrossing the border, thereafter reduced to using a latter-day writing technology, but one acceptable to the Mexicans: a pen and paper pad.

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.



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GETTING AHEAD IN DP/Donald J. Berardo‡

How to Write an Internal DP Resume

An internal resume is a valuable communication tool that you can use to publicize your talents and advance your career. Considering the complexity of the DP environment in most corporations today, the internal resume is a good way of informing your management, user areas and others about you as a skilled, high-potential DPer.

If your company has a job-transfer system, the internal resume will keep it honest and working in your behalf. The format and content are similar to an external resume, but differ in content concentration and the breadth of applications or uses. It is your marketing piece, your way of promoting your talents along with your performance and winning attitude. Here are some basic applications for your internal resume:

- Whenever you enter a new user area.
- As an update to your manager before appraisals.
- As an addendum to your proposals.
- As an update to your external resume.
- As an introduction to your requests for new and better assignments.
- As documentation of your progress to yourself and others.

Target each phrase, DP term and your best features toward each specific audience you hope to impress. Try to be creative and novel, but not trite or cute. Keep your internal resume within well-defined limits: three to four paragraphs with a beginning, a middle and an end, with dates bracketed at the end of each paragraph. Summary paragraphs and underscoring are acceptable.

Your internal resume should be neatly typed and without errors. Make your choice of words, both technical and descriptive narrative, as simple and interesting as you can for each audience. Always consider first who your reader will be, and then write to provoke interest in you.

Before you compose a final draft, you might want to follow a simple outline (purpose = salary bump, transfer and new job). First, at the top of the resume, include your name (capitalized, underlined and centered) and your current salary (in brackets below your name).

Next, state your purpose (capitalize and underline "purpose"). For example: This interal resume is a brief summary of my credentials for you to consider. It is offered in regard to your posted position of DP consultant in your department. I would hope you may find this information sufficiently stimulating to warrant our meeting personally, at your convenience. Please call me (give your extension number) if your schedule will allow this.

Next, present a skill summary (capitalize and underline "skill summary"). For example: six years software/analysis, systems (Cobol, BAL, PL/I, DL/1, Basic and customized packages), IBM 370/45, OS/MVS, MVT, plus on-line or batch. Strong developmental/analysis skills for new or existing applications. Light to medium supervisory exposure, enjoy training and directing others. Excellent personal appearance, verbal skills good and can work well with anyone.

Next, present applications (capitalize and underline "applications"). For example: several business systems analysis and highly technical applications (investments, accounting, file building, customer service/billing and point-of-sale network processing). Also, many subset modules, as well as related dump/error analysis and redesign applications.

Next, list your personal traits (capitalize and underline "personal traits"). For example: quick to learn, self-starting, work alone or as a solid team member. Dedicated to DP as a career or using DP in other line or staff areas. Good intellectual grasp of DP and advanced theory and practices in the field. Enjoy additional responsibility, well organized and self-disciplined.

Berardo is a management counselor and career therpist. He is a vice-president with the Meld Group in West Hardford, Conn., publishers of a monthly newsletter on management develpment.

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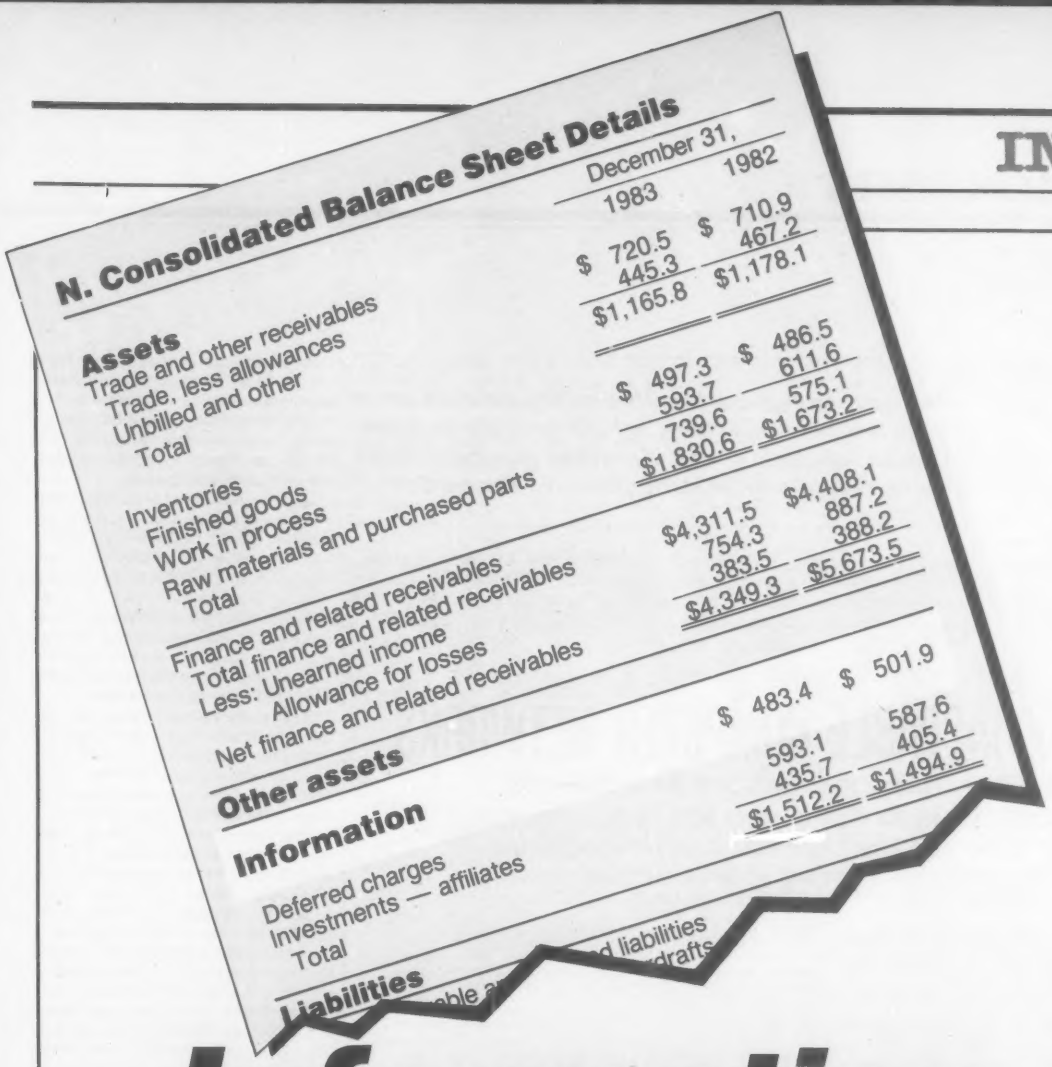
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N. Consolidated Balance Sheet Details

	December 31, 1983	1982
Assets		
Trade and other receivables		
Trade, less allowances	$ 720.5	$ 710.9
Unbilled and other	445.3	467.2
Total	$1,165.8	$1,178.1
Inventories		
Finished goods	$ 497.3	$ 486.5
Work in process	593.7	611.6
Raw materials and purchased parts	739.6	575.1
Total	$1,830.6	$1,673.2
Finance and related receivables	$4,311.5	$4,408.1
Total finance and related receivables	754.3	887.2
Less: Unearned income	383.5	388.2
Allowance for losses	$4,349.3	$5,673.5
Net finance and related receivables		
Other assets	$ 483.4	$ 501.9
Information	593.1	587.6
Deferred charges	435.7	405.4
Investments — affiliates	$1,512.2	$1,494.9
Total		
Liabilities		

Information as Corporate Asset

By David R. Vincent

By the end of this decade, every enlightened corporation will include the information asset in its financial reports. In an internationally competitive environment, the challenge will be to optimize the value of information. By so doing, businesses will realize productivity gains and sustain their competitive edge.

The largest investment in many companies today is the creation and maintenance of information. Therefore, executive management and stockholder attention should (and probably soon will) focus on the amounts spent on this investment, the return on investment and the productivity gains to be made both in current reporting periods and in the future.

It has been estimated that in organizations such as banks and insurance companies, as much as 25% of the organization's payroll alone is invested in creating and maintaining information needed to continue normal business operations. Therefore, it would not be unusual to see a major corporation with a total payroll of $100 million per month investing $300 million annually in information. This total does not include information systems, which may run another $2 million per month, bringing the annual total up to $324 million. Out of this total, only 7% represents the portion that has traditionally been considered "DP." Where is this significant investment reported and analyzed?

Information economics is a discipline concerned chiefly with describing and analyzing the production, distribution and consumption of information and knowledge. Information economics will play a crucial role in large organizations that depend on information to fulfill their mission and to maintain a strong competitive posture.

In his recent book, *The Fifth Generation*, Prof. Edward Feigenbaum stated that the U.S. tax laws inhibit the development of information and knowledge technology. Actually, a more meaningful and important

IN DEPTH

change is necessary in the thinking of the economic, financial and accounting community: to recognize the asset value of information and knowledge as an inventoriable commodity in enterprises. This revelation will probably change some tax laws, but a basic misunderstanding about the value of information is the root cause of a short-term profit motivation that overlooks the value of information and knowledge.

Under current generally accepted accounting principles, there is no value ascribed to information because it is not recognized as an asset. With this being the case, all investment made in information must be expensed during the current period, that is, it is subtracted directly from the profit of the enterprise. Those organizations trying to maximize current profits (as most currently are after a long economic drought) will avoid investments (expenses) that are related to information.

'Information that exists within an organization (even though it is not sold externally) can certainly be classified as an economic good if it could be purchased on an open market instead of being produced internally.'

The recognition of information and knowledge as true corporate assets has a basis in current economic and accounting theory. An asset classically has three essential characteristics:

1. It embodies a probable future benefit that involves a capacity, singly or in combination with other assets, to contribute directly or indirectly to future net cash flows.

2. A particular enterprise can obtain the benefit and control another enterprise's access to it.

3. The transaction or other event giving rise to the enterprise's right to control of the benefit has already occurred; that is, the enterprise has already made the investment, it is for exclusive use by the enterprise and it is in usable form.

There are several ways that an asset may be reported. The most common is to have a separate line item in the asset category. An extremely conservative method (for those less courageous) is to add an imputed value as a footnote to the statement, such as those that are included for long-term leases and other potential cash flow considerations. If information is included as an asset, the total assets will increase by that amount. This investment is not included in any other asset, with the exception of patents or trade secrets. The outcome would be increased net worth and profitability during the current period.

Resistance to this change comes from the accounting and economic communities, which are capital-oriented (a la Adam Smith's *Wealth of Nations*). The reason for this resistance is the difficulty in proving the relationship between information and future cash flows. One of the principles of accounting is conservatism, and a basic "show-me" attitude is the result. This attitude is not always bad, because some companies have abused accounting practices, with the resulting "surprise" to shareholders. However, in the case of information, what is needed now is ingenuity, sound economic analysis and the desire to move forward into the information era.

It will be difficult for information systems managers to lobby for such a change within their organizations without some general outside support. The financial statements are, in the final analysis, certified by a public accounting firm as to their adherence to generally accepted accounting principles. Right now, reporting information as an asset would probably be rejected. However, systems executives along with chief financial officers could work together with the American Institute of Certified Public Accountants to bring about such a

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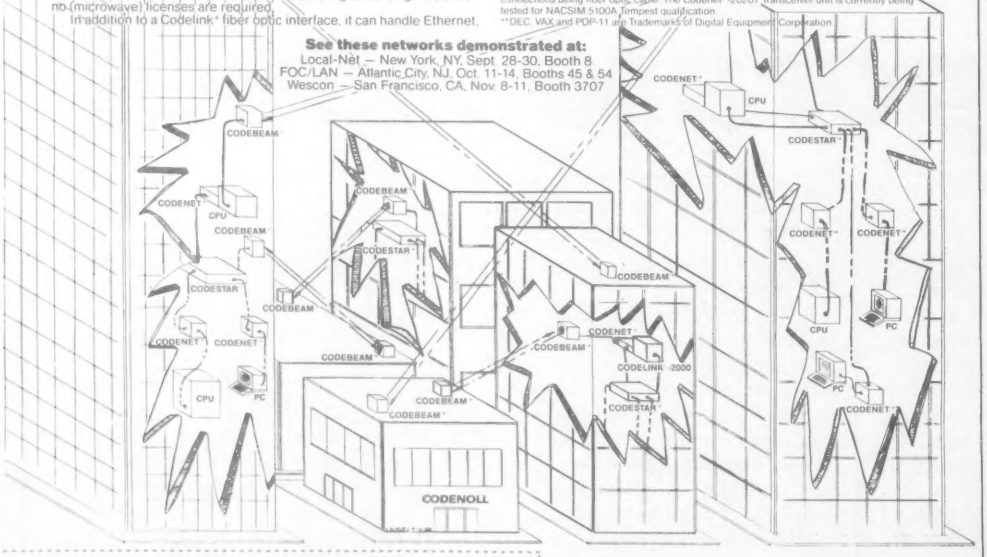
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change. It would ultimately result in a statement from the Financial Accounting Standards Board (similar to the recent pronouncement on accounting for gains and losses in foreign currency translations).

Information Commodity

Economic theory defines a good or commodity as something useful or valuable, especially when it is an item of commerce that can be sold and delivered for shipment. Information commodities such as mailing lists, research reports, market studies, patents and trade secrets are regularly sold or licensed as well as delivered after the sale. Medical and legal libraries have been developed and automated so that they may be offered for sale or lease as an ongoing and profitable service. An example of such a system for medicine is Internist/Caduceus, developed at the University of Pittsburgh, which covers more than 80% of all internal medicine, including about 500 diseases and 3,500 manifestations of those diseases.

An example of a legal system is a library named Weslaw developed and sold by the West Publishing Co. in St. Paul, Minn. Lawyers can have this system prepare entire briefs for them by entering the subject area from remote terminals. Such valid and real economic information commodities certainly meet the above criteria for an asset.

Information that exists within an organization (even though it is not sold externally) can certainly be classified as an economic good if it could be purchased on an open market instead of being produced internally. Mailing lists that are purchased instead of created are an example.

Because of the specific nature of (and the security factors surrounding) internally created information, the possibility of purchase may be obviated, but this fact does not diminish the book value of the information. Accepted accounting practice allows for this situation by providing that an asset may be valued at cost or market, whichever is lower. If there is no market price, then cost is used as the financial value.

Accounting Implications

The classification of information or knowledge as an asset implies that there is a method for determining its cost as well as its value and useful life. The data processing "accounting" community has developed numerous methodologies, techniques and "DP cost accounting" software packages designed to allocate processing costs to the users of DP services. The result has been complicated reports of DP "standard costs" and chargeback rates to the system's users. In fact, none of these methodologies or techniques reflects the real nature of information systems costs today.

It is imperative that information be recognized as the major resource, not the data processing hardware and software used to make it available. With this recognition, the true costs of information can be calculated, including the investment in information systems as well

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as the investment in information. This calculation would include (as a minimum):

1. Creation costs, which are primarily labor as well as that portion of information systems used in the process. The labor element is substantial, especially in those enterprises involved in financial services, banking, insurance, communications, transportation and consumer marketing.

2. Maintenance costs, including the updating and purging of information.

3. Production costs, including the information systems costs, labor costs and communications expenses required to make the information available when, where and how it is needed to serve the purpose of the enterprise.

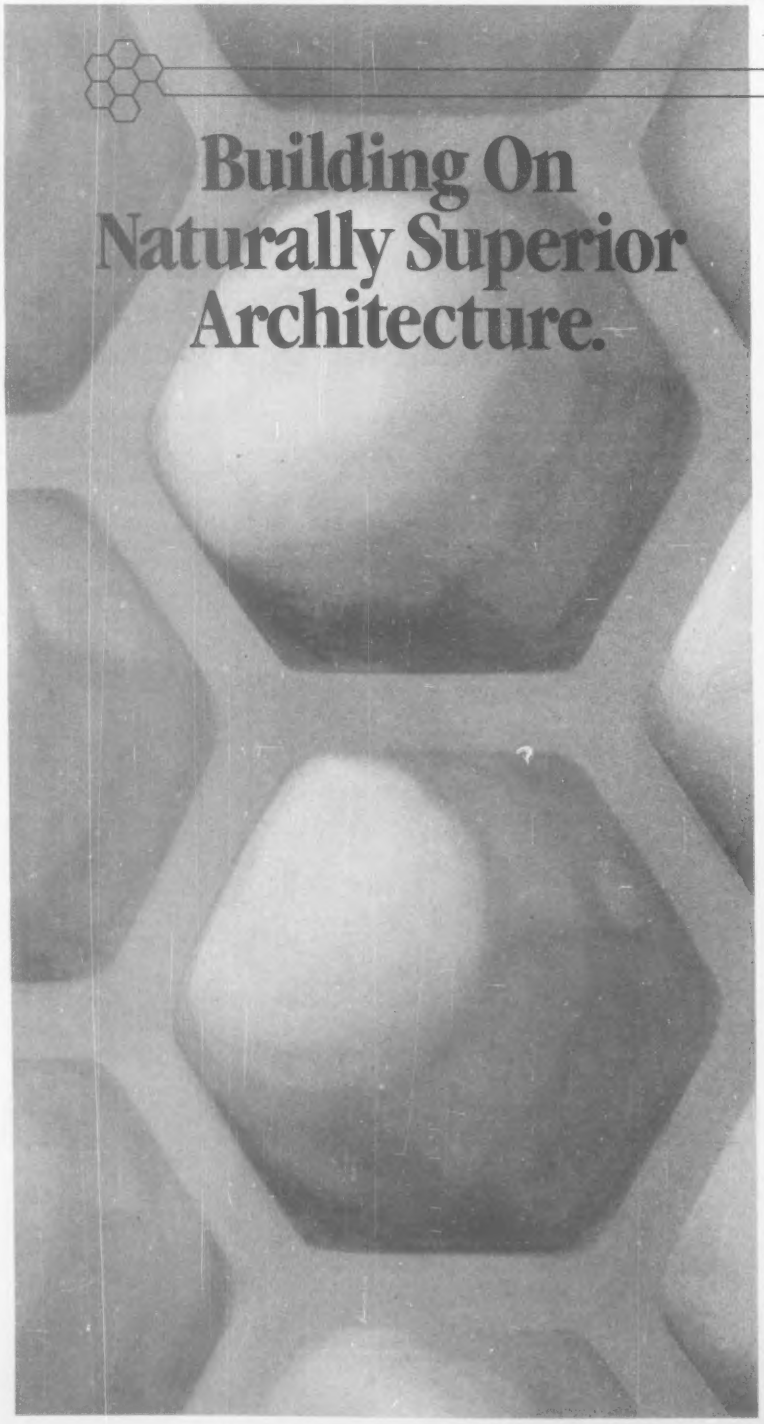
Traditional cost accounting principles were developed in the manufacturing environment to account for variable material, labor and overhead costs on a unit-of-manufacture basis. In the factory, material is neither ordered nor used unless there are units to produce. If the material is on hand but is not needed for production, it is inventoried as an asset.

Likewise, labor is not used unless there are units to produce. A lack of production need results in immediate layoffs to avoid unnecessary labor expenses, or, in the worst case, some units are produced and inventoried, including the labor expense as a part of the inventory asset. There are some fixed costs that will accrue in any event; these typically are not inventoried and may contribute to lower profits in low production periods.

In the information systems environment, the variable costs are few. Labor is not treated like factory labor; since short-term layoffs may result in permanent employee loss, such layoffs are not typical. Other variable costs such as removable storage media, paper and electricity are such a small part of the total information systems cost that they are not considered major factors in the information investment. All the remaining systems costs are relatively fixed (hardware, software, development and operations staff, facilities and management). Furthermore, some of these fixed costs grow at an annual rate of 20% to 60%, depending on the type of enterprise.

Along with the information systems investment growth, other information investments are also increasing at an accelerated rate because of the productivity gains resulting from increased systems availability. A good example is the emerging concept of the information center along with executive workstations.

Management acceptance of this kind of information expense growth rate will come only from a clear valuation process that relates the investment made in the information asset to expected financial return (in terms of future increases in revenue or future decreases in expense that will result in incremental profit). From this valuation process, the return on investment (ROI) may be calculated and the responsibility for ROI achievement



INFORMATION ASSET

IN DEPTH

assigned. The next logical step is the capitalization and amortization of information costs over a period of time equal to their benefit or useful life. These costs could then be reported in the enterprise's financial statements just as any other asset. The audit criteria for this asset would be similar to those used for accounts receivable — that is, documented as to their accuracy, verified and related to future cash flows.

If an item is reported as an asset, a useful life must be determined and some method of matching the cost of the investment to the generation of future cash flows must also be implemented. In the case of asset accounting, investment costs are capitalized by an accounting entry, with this amount amortized or depreciated over an appropriate period of time. An example is the acquisition of a CPU, which may be expensed over a four-year period. Some assets, such as buildings, are amortized over a much longer period of time. Improvements or additions to the assets may be added to the value of the asset, with a commensurate amortization schedule.

In the case of information, even though the initial useful life may be determined to be three or four years, the actual value may be increased by added information and information "maintenance" that would in effect extend its useful life.

The audit criteria are simple: Is the information accurate and not generally available? Can its value be related to the generation of future cash flows? For example, computerizing information obtained from the Bureau of the Census might be regarded simply as automating public information; this information would have no specific asset value, since it is not the exclusive property of the organization.

However, by analyzing the information and adding other data, this information might become unique and usable for generating future cash flow. The audit must determine whether this is the case. The audit might include some statistical sampling to evaluate the accuracy of the data as well as its availability from some public source.

Hardware, Software Costs

One source of confusion should be put to rest: How should the hardware and software costs of information systems be treated? It should be evident that as processing technology advances at a geometric rate, the hardware portion has a shortened life cycle and should probably be considered as a throwaway kind of asset (similar to an automobile).

After the hardware has served its useful life, which may be predicted on an obsolescence curve, its only residual value is scrap. For example, it is no accident that when IBM makes a piece of equipment financially attractive to purchase, as opposed to lease, that equipment is usually toward the end of its useful life.

A case in point is that IBM, over the past three decades, has optimized the production of each generation of its computers on four-year

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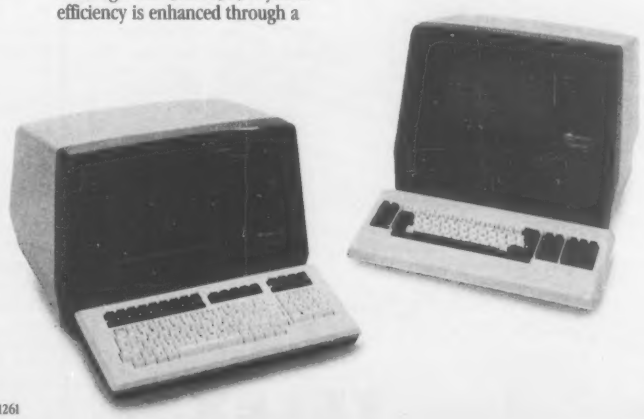
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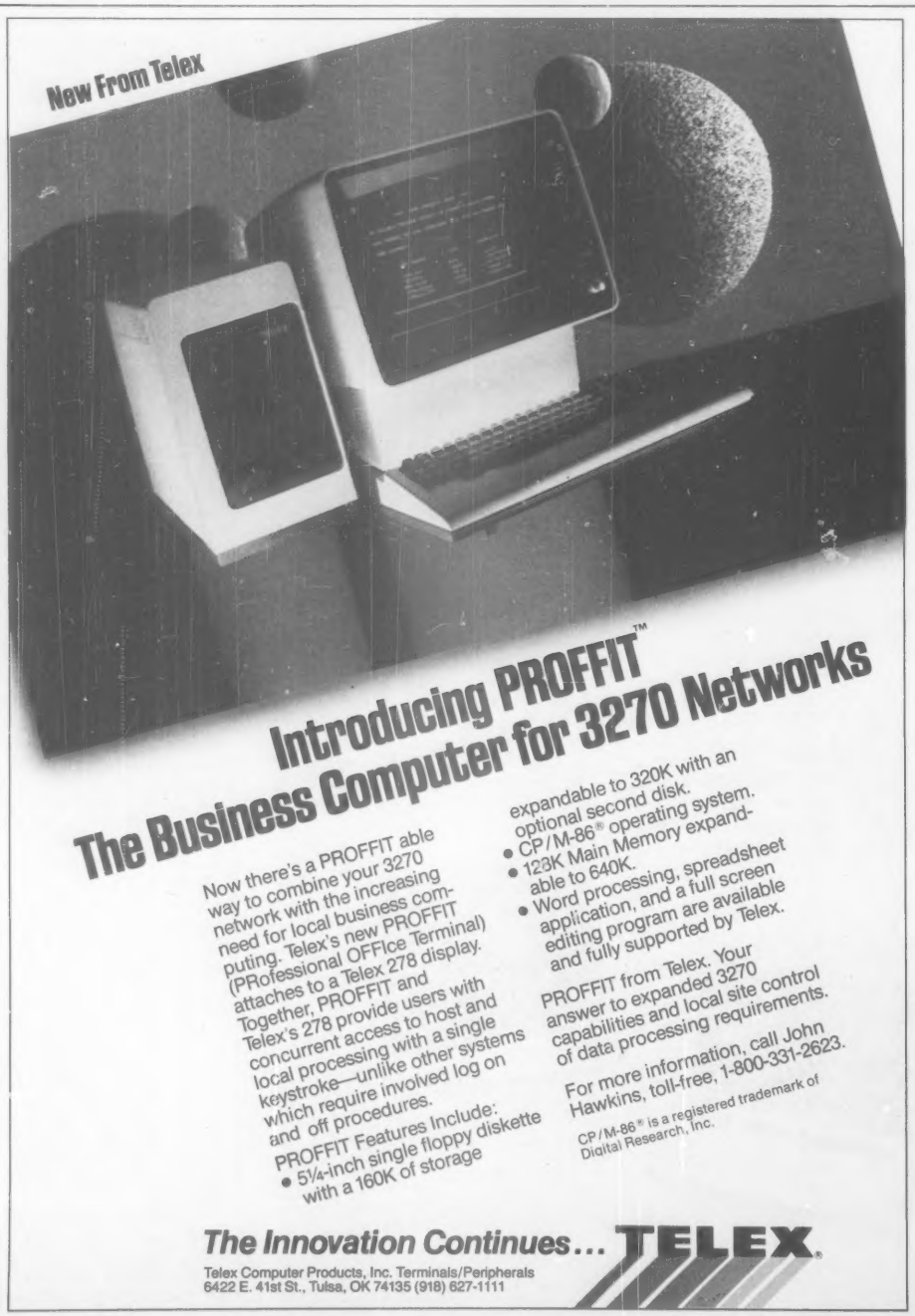
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IN DEPTH

cycles. Every four years, IBM announces a major line of processors, thereby rendering the previous generation obsolete (or at least significantly reducing its residual value). The 30 series of CPUs was announced in 1980, with production shipments geared up in mid-1981. It can therefore be inferred that, given its cyclic history, IBM will announce a new generation in 1984, with major shipments in 1985.

Recent announcements from IBM concerning its 30 series (especially the 3083, which is a version of the 3081) have indicated a significant reduction in the purchase price and, at the same time, a significant increase in the lease price. On this basis, does it make sound financial sense to purchase a 3083?

'Information systems specialists such as capacity managers and data base administrators have been responsible for system response time and "performance," applying minimal thought as to what information needs are being satisfied.'



Technological Shifts

The current shift in information systems is moving away from software engineering to information engineering. This shift is taking place because more emphasis is being placed on what is done with information rather than how it is done. The term "software engineering" refers to the set of disciplines used for specifying, designing and programming computer software, including applications as well as operating and subsystem software. Until recently, this subject has commanded the attention of information systems technicians, but it is now dwindling in demand as a percentage of the total effort.

The term "information engineering" refers to the application of information economics, by which the properties (including stability) and sources of information are made useful to people. In this case, "people" may include expert or knowledge-based systems that make decisions as people would, provided that they are supplied with appropriate information.

The primary focus of the information engineering activity is the information and knowledge that are stored and managed with information systems technology. The result is the supply of information where it is needed to perform the functions of the organization being served. As opposed to information engineering, software engineering is primarily concerned with the internal logic that is used in the information systems process.

Systems and applications programmers have been concerned primarily with software engineering and only slightly with information engineering. Until now, information systems specialists such as capacity managers and data base administrators have been responsible for system response time and "performance," applying minimal thought as to what information needs were being satisfied. With a new emphasis on information economics, these parties will be more concerned with information as it relates to the organization and the society it serves.

As hardware and software vendors increasingly automate the process of software engineering, they make possible the shift from applications programming as a centralized and specialized process to one that can be handled by decentralized information systems users. Examples of such user-controlled systems are executive workstations (basically personal computers) that can run such complex programs as Visicorp's Visicalc and Lotus Development Corp.'s 1-2-3 and information centers that offer fourth-generation languages for the "non-DP" user.

Again, time will affect the course of this developing concept of

centralized information with decentralized processing and applications.

Reexamining Activities

As previously stated, the cost of information systems, although a significant investment, is only part of the much larger corporate investment in the information asset. Information coordination and management activities that will fall under the aegis of the person who is currently called the vice-president of information systems (soon to be called the chief information officer) include:

- Storage of the information asset.
- Management of the information data base.
- Information processing.
- Information transfer.

With users' heightened desire for quick response time and local control over the manipulation of information, it will become even more popular to process information locally, with files coming from a central source. Then it will be necessary to ascertain the relevant costs and benefits of centralized vs. decentralized processing.

Decentralized processing and centralized information may result in a central facility almost as big as that in the case of centralized processing just to handle the storage and data base management systems. However, the alternative of decentralizing both storage and processing brings into play another set of issues: accessibility, security and control of the information asset.

With either centralized or decentralized processing, information economics will help to resolve such issues by applying sound economic and financial analyses to determine which alternative(s) will optimize the long-term value of the information asset. These analyses will take into account costs such as:

- Information security and control.
- Measurement and planning costs.
- Documentation and training.
- Systems integration and communications compatibility.
- Information stability and redundancy.
- Maintenance of central data base integrity: that is, all files are documented, and all updates and changes are reported and controlled by management.

Whether a data base is centralized or decentralized, information transfer will be one of the major information costs of the future. Even though the advent of low-cost, shippable optical disks may provide some temporary relief, the data base concerns of integrity and currency may still present an obstacle to their use for many on-line applications.

Characterizing Activities

The characteristic behavior of each of the above areas of information activity is unique.

In order to control, plan and measure the results of each activity area, some uniform metrics are vital to ensure information management success.

Some guidelines are offered in the table below for describing the salient characteristics for each information activity area. A metric for each area is set forth. In some cases, the indicated metric is the same — for example, bytes or time. But since each area is unique, the metrics have different connotations depending on the activity being measured. Therefore, the same measures for different areas should not be added to represent a composite sum for overall information activity (as has been done by some practitioners using measures such as software physics "works," computer resource units, MVS service units and the like). Such overall

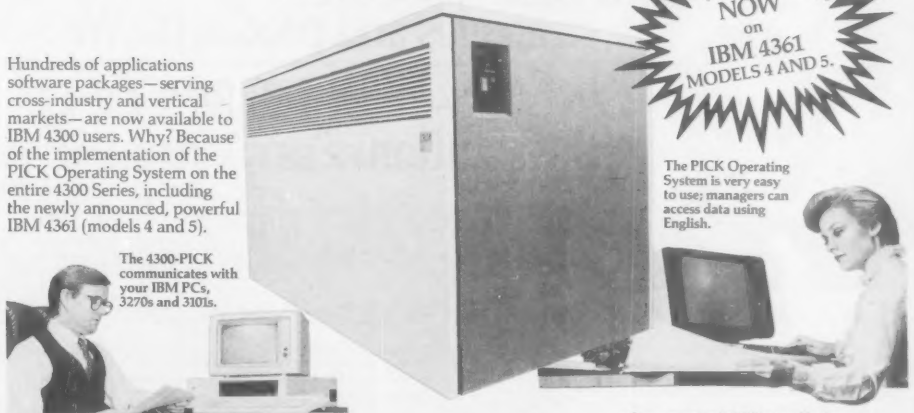
Metric	Storage	Management	Processing	Transfer
Basic	Space	Time	Time	Time/Distance
Alternate	Bytes	Bytes	Bytes	Bytes/Distance
Other	Media	System	Peak/Time	Peak/Time

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measures may produce some "interesting" analyses, but adding across activity areas obfuscates their unique aspects.

The confusion that might occur from adding like but unique elements can be illustrated by the labor required to construct a building. In order to construct a building, there must be an architect, electricians, carpenters, bricklayers, metalworkers and so on.

The efforts of all of these people are measured by time (hours, man-years and the like). The simple statement that a building will require 1,000 man-years of construction time will not be usable for any kind of planning or management process.

'Clever people can think up algorithms to explain system behavior with composite statistics, but information managers and users will not be able to understand them or use them in making important decisions regarding information systems investment.'

The types of unique resources must be specified individually: electrician man-years, bricklayer man-years, architect man-years and so on.

Clever people can think up algorithms to explain system behavior with composite statistics, but information managers and users will not be able to understand them or use them in making important decisions regarding information systems investment.

Such traditional, nonmanagement-oriented algorithms often appear in capacity management reports that dwell on percentages of CPU utilization. In today's on-line environment (in which CPU utilization statistics do not correspond directly to speed of service), what kinds of decisions can be made with that kind of information?

Storage Costs

The costs for information storage should be associated with the type of media used (tape, disk, mass storage) as well as the space occupied. The metrics of bytes or space are both quantity measures. For the purpose of this discussion, it really doesn't matter which metric is used. What does matter is how to relate the investment made in storage to how it is used to satisfy user information needs and, as a corollary, what it is worth to the user.

Information data base management costs should include all the information systems resources needed to get information into and out of storage. The kinds of systems resources used include CPUs, disk and tape devices, controllers and various software and operating subsystems. The important thing is that the data base management costs be associated with the time that an I/O subsystem is used, that a device is used or, with the advent of cache memory devices, that cache memory is used. This would apply to such media as mass storage or tape devices. These costs are systems costs, as opposed to the physical storage space for information. These costs are related not to the space consumed but to the resources required to place information in storage and then, later, to find and retrieve that information in the same form.

With the focus on the storage of information, the management processes of planning, implementing, measuring and modifying can begin. If an organization wishes to survive in the information age, it must first have an overall organizational strategic plan for the creation, automation, storage and security of information. In an environment where this plan does not exist, information systems capacity planners will never be able to provide properly the optimal amounts of storage media at the best economic benefit to the organization.

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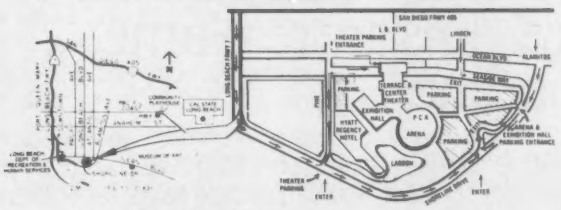
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around the size of the facility to house information systems. An embarrassing, but very familiar, phenomenon is the situation in which the facility space requirements exceed the physical capacity of the new, and much celebrated, data center.

Hardware vendors have done much to reduce the space taken by a processor, but if the 3380-type disk drive devices are any indication of the space requirements for storage, then the information systems community is in for a hard time.

Fortunately, optical disk storage technology is expected to take significantly less space once the laser mechanics are worked out.

The information systems effort in the data base management area will likewise present a real challenge. The information resources to be planned and controlled will include the largest CPUs.

The systems community is now awaiting the announcement of uniprocessors that will handle 50 million to 100 million instructions per second. The Japanese are planning systems many times larger as part of their fifth-generation project for knowledge and information processing systems that can process 100 million to one billion logical inferences per second.

These processors will not be used for doing a greater amount of batch and on-line work. Rather, they will manage the vast amounts of information that will be stored for use by knowledge-based systems.

Security, data integrity and performance are key issues for this area, along with such items as relational data bases, data dictionaries and the enforcement of information handling standards throughout the organization. These standards will necessitate ensuring that little pockets of "private" information are not held back from the organization's data bases.

This practice is analogous to setting up little bank accounts with corporate money at various remote locations to squirrel away sums for "just-in-case" situation. The corporate treasurer is responsible for ensuring that these kinds of things do not happen to corporate funds. The chief information officer assumes this same kind of responsibility for the company's information. But carrying out this responsibility is going to be one of the major challenges of the next 10 years.

With the availability of local processing, the appetite for information will increase. Since it will not be practically feasible, or even desirable, to maintain large local data bases, information transfer between the central facility and remote locations will demand more and more of the capacity planner's attention. This function, at present, is delegated to a network or communications department, often located at a very low organizational level.

Since the job of making the information asset available represents one of the most crucial areas of information systems responsibility, the information transfer function should be an integral part of the corporate capacity management staff. Again, important organizational decisions regarding the investment in telecommunications equipment and service will be required. Many organizations will invest in their own satellite systems to provide the information transfer speeds necessary to meet their organizational goals for productivity and return on investment.

In the final analysis, it is the expeditious use of information and a comprehensive understanding of its value in each area of business activity that will result in sorely needed gains in productivity. Organizations with this understanding will be the corporate winners in the information age.

About the Author

David R. Vincent is currently vice-president of Boole & Babbage and general manager of the Institute for Software Engineering in Sunnyvale, Calif. Previously he was general manager of Boole & Babbage's Educational Services Division and product marketing manager.

Vincent has written articles on service-level management, DP operational standards, data center management and DP technical and economic trends.

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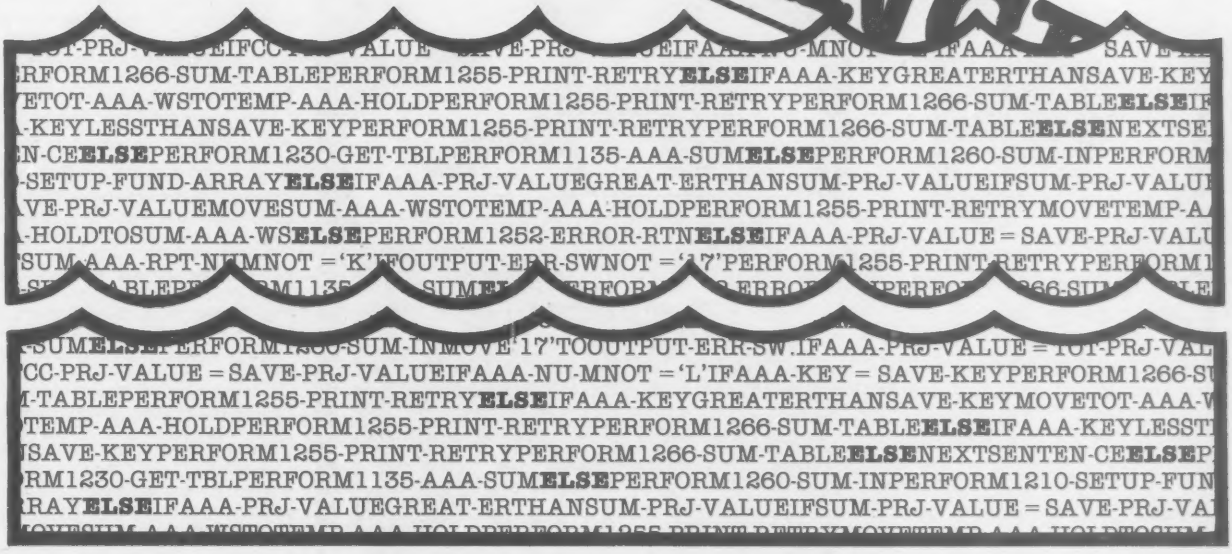
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SOFTWARE MAINTENANCE



By Gopal Kapur

Software maintenance is the enigma of data processing. It is an accepted fact that 50% to 80% of data processing resources go toward software maintenance, but little effort has been made to analyze the problem and propose a solution.

Hardware and software vendors, universities, self-proclaimed gurus of DP education, developers of system life-cycle methodologies and purveyors of structured tools conveniently sidestep this important and predominant component of system life cycles. The maintenance issue has even been ignored by the data processing managers who are directly affected by it and by the users who pay dearly for it.

Ten years ago, the development cost on one Department of Defense project was reported as averaging $75 per instruction, while maintenance costs ran as high as $4,000 per instruction. Certain projects today are approaching those figures.

Why this neglect of such an important subject?

1. Software maintenance is not perceived to be as exciting as new development.

2. It is not as rewarding (monetarily and professionally) as developing new systems.

3. It forces management and the technical staff to face the inadequate code being developed in the data processing departments.

4. Very few tools, techniques and research have been directed toward it.

5. Users don't realize and seldom question its high cost.

6. DP management is waiting for a magical solution. Hope springs eternal for an all-encompassing "structure engine" — the ultimate maintenance fix.

In addition, many DP professionals have cherished the idea that their profession is an art form. How could one set rules, regulations, boundaries and quality criteria for artists? That would, of course, stifle creativity and limit expression — unconscionable.

During the mid-1970s, concern actually developed for the problem of software maintenance. Then came the shining beacon of structured methodology — the panacea to software problems. Remember the glorious claims we heard when structured methodology made its debut? Program reliability and readability would hit unprecedented highs, as maintenance costs turned down.

Unfortunately, few of the expected results have materialized. Programmer productivity is nothing to shout

IN DEPTH

about, software quality is still dubious and, most significant, maintenance costs are rising steadily.

It is interesting to note how the total sins of poor analysis, absence of design, low-quality code and almost nonexistent testing were blamed on the GOTO instruction. We read, "Get the GOTO out of your programs and the problem of poor software and heavy maintenance is sure to go away." Oh, what a relief it would have been.

'It is ironic that the increased programmer productivity (often measured as the ability to write code faster) in many cases actually added to the maintenance problem.'

It was amusing to see author after author (most of them never having written a "real" program, let alone having maintained one), teacher after teacher and hordes of newly ordained "structured programmers" join the GOTO-less bandwagon and extol the virtues of their new-found belief in deeply nested IFs. Next, if one would be so smart as to include a heavy smattering of PERFORMs, nirvana would be upon us.

Plunge Postponed

The illusion of the structured solution was shattered when the newly developed software (erroneously believed to be well-engineered) was put into production and maintenance costs did not take the must-awaited plunge.

It is ironic that the increased programmer productivity (often measured as the ability to write code faster) in many cases actually added to the maintenance problem. Figure 1 is an example of such "structured code." This example was extracted from an original routine consisting of 97 lines.

This, mind you, is a single sentence, 50 lines long. It contains enough nested IFs and enough PERFORMs to impress even a computer science graduate. But what does it do?

You can imagine having to face this and similar code in the middle of the night when the program has bombed, the manager is looking over your shoulders and the payroll has to be run by morning.

Where did all this obscene code come from? And, more important, where can we turn for a solution?

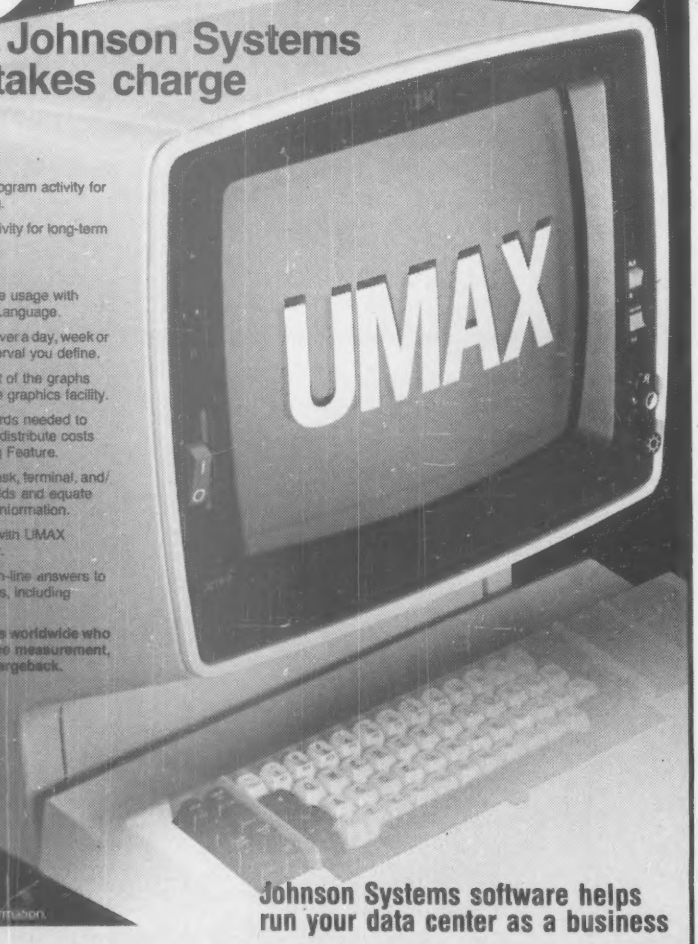
Unfortunately, most authors and consultants in the field of software engineering don't have the solution. Here are three typical examples:

Glass & Noiseux, in their book *Software Maintenance Guidebook*, state, "If you are reading this section to get an answer to the question, 'How can I reduce my maintenance costs?' and the question is about an already mature system, you may be asking the question too late. The nurturing and upbringing of the system

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```
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    IF CC-PRJ-VALUE = SAVE-PRJ-VALUE
        IF AAA-NUM NOT = 'L'
            IF AAA-KEY = SAVE-KEY
                PERFORM 1266-SUM-TABLE
                PERFORM 1255-PRINT-RETRY
        ELSE
            IF AAA-KEY GREATER THAN SAVE-KEY
                MOVE TOT-AAA-WS TO TEMP-AAA-HOLD
                PERFORM 1255-PRINT-RETRY
                PERFORM 1266-SUM-TABLE
            ELSE
                IF AAA-KEY LESS THAN SAVE-KEY
                    PERFORM 1255-PRINT-RETRY
                    PERFORM 1266-SUM-TABLE
                ELSE
                    NEXT SENTENCE
            ELSE
                PERFORM 1230-GET-TBL
                PERFORM 1135-AAA-SUM
        ELSE
            PERFORM 1260-SUM-IN
            PERFORM 1210-SETUP-FUND-ARRAY
    ELSE
        IF AAA-PRJ-VALUE GREATER THAN SUM-PRJ-VALUE
            IF SUM-PRJ-VALUE = SAVE-PRJ-VALUE
                MOVE SUM-AAA-WS TO TEMP-AAA-HOLD
                PERFORM 1255-PRINT-RETRY
                MOVE TEMP-AAA-HOLD TO SUM-AAA-WS
            ELSE
                PERFORM 1252-ERROR-RTN
        ELSE
            IF AAA-PRJ-VALUE = SAVE-PRJ-VALUE
                IF SUM-AAA-RPT-NUM NOT = 'K'
                    IF OUTPUT-ERR-SW NOT = '17'
                        PERFORM 1255-PRINT-RETRY
                        PERFORM 1266-SUM-TABLE
                        PERFORM 1135-AAA-SUM
                    ELSE
                        PERFORM 1252-ERROR-RTN
                        PERFORM 1266-SUM-TABLE
                        PERFORM 1255-PRINT-RETRY
                        PERFORM 1266-SUM-TABLE
                ELSE
                    PERFORM 1230-GET-TBL
                    PERFORM 1135-AAA-SUM
            ELSE
                PERFORM 1260-SUM-IN
                MOVE '17' TO OUTPUT-ERR-SW.
```

Figure 1

have already determined its complexity, modifiability and, therefore, to a large extent its maintenance cost. Ask, instead, about your next software system.".

Edward Yourdon has admitted, "If you're one of those unlucky managers who is stuck with the maintenance of 1,000 man-years of unstructured code, there is not much I can do for you, other than offer you a lot of sympathy . . ."

Another writer, having missed the real concepts of software engineering, advised his audience to "go back to using Cobol as it was originally conceived" [CW, June 27]. I sincerely hope that Jerry Sitner is not opposed to the inclusion of END IF, PERFORM USING, END PERFORM, in-line and called subroutines (to name a few of the much-needed improvements) and the removal of ALTER, CORRESPONDING and many other aberrations of Cobol.

Cause for Hope?

The new light at the end of the maintenance tunnel is the promise of a programmerless society. The premise proclaimed by purveyors of the new DP snake oil goes something like this: If one could get rid of

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Maintenance Problems	No. of Responses
1. No formal charter for the maintenance group.	10
2. Minimal standards for maintenance.	12
3. Poorly enforced standards for development.	14
4. Inadequate change request system.	9
5. Maintenance staffed by junior programmers.	11
6. Users not cooperative in checking test results.	9
7. Little protection of the maintenance group. (reaction to heavy pressure)	7
8. Unauthorized/unapproved changes.	5
9. Lack of maintenance history.	9
10. Programs maintained without any care for structure and documentation.	10
11. Absence of cross-reference of files/data to programs.	9
12. Absence of cross-reference of reports to programs.	11
13. Absence of cross-reference of tables to programs.	10
14. Lack of good test plan and test data bases.	12
15. Often-changing data values are hard-coded.	10
16. Logic for tables used in multiple programs is not centrally coded and reused.	9
17. Table values that change quite often are hard-coded.	11
18. Documentation not up to date to reflect the maintenance activity.	12
19. Poor/bad programmer-supplied names.	9
20. Tricky source code without any comments.	14
21. Deeply nested IFs that are difficult to comprehend.	11
22. Multiple-layered PERFORMs.	10

Figure 2

'The DP industry needs to take a fresh look at the resources it is allocating to maintenance. DP and user management must develop matching interests, back them up with commitment and use innovative methods to combat this long-neglected problem.'

all these programmers, one would not have all this bad code to maintain. Even if this end were possible, of course users cannot simply throw away the thousands of lines of existing poor code and start fresh. The problems still persist.

The new light at the end of the tunnel for many of these managers happens to be the headlight of the train coming at them.

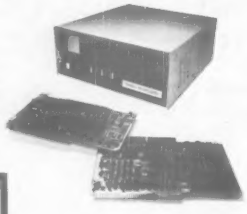
By now it is obvious that the romantic promise of new technology is not the answer to the problem of existing software maintenance. As Timothy Cronin, president of Inforex Corp., observed in an interview printed six years ago in *Dun's Review*, "There's more technology around now than can be used. We don't need more technology but rather a change in attitude so that it can be used better."

The DP industry needs to take a fresh look at the resources it is allocating to maintenance; DP and user management must develop matching interests, back them up with commitment and use innovative methods to combat this long-neglected problem.

During the mid-'70s, researchers began to warn us that software maintenance was beginning to consume disproportionate amounts of DP resources. For example, Barry W. Boehm stated, "Software maintenance is an extremely important but highly neglected activity . . . About 40% of the overall hardware-software dollar is going into software maintenance today, and this number is likely to grow to about 60% by 1985." Data processing publications, all through the '70s, were full of similar warnings of this imbalance between software development cost and

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subsequent maintenance. The question is: Were the DP managers, analysts and programmers paying any attention to these warnings? Recent research by Lientz and Swanson, reported in *Software Maintenance Management* (Addison-Wesley) showed that close to 50% of total man-hours worked annually by application programming and systems analysis personnel were spent in software maintenance.

If one adds to this the time management needs to supervise, technical support personnel time and the hardware resources used by the maintenance staff, the total resources for maintenance easily approach 70% of the DP budget. This study corroborates research by Kapur & Associates, which found that close to 60% of DP resources were being devoted to software maintenance.

Conspiracy of Neglect

It is ironic to note that a typical data processing organization is staffed with a manager of programming and systems development, manager of technical support, manager of operations and, at times, even a manager of planning. But seldom does one encounter a manager of maintenance who has equal reporting level, clout and respect.

There seems to be a conspiracy of neglect: If we don't acknowledge that maintenance exists, perhaps it will go away — the grand delusion.

Dr. John King, University of California, stated in a 1980 article, "The nation's economic turbulence will probably increase DP work loads as well as the cost of system maintenance during the next few years . . . possibly killing system development in centers operating under strictly enforced budget ceilings." King continued, "By clamping a lid on DP funding, the company would force its DPers to curtail development because the lion's share of that money would be needed for support of maintenance." In view of these dire predictions, one might hypothesize the following:

1. In terms of total hours worked annually by your programmers and analysts, what percent is spent on:
   a. New development: _____%
   b. Error correction: _____%
   c. Additions/changes/deletions of functions: _____%
   e. improvements: _____%
2. Does your organization have classifications for the following (or similar) position titles?
   a. Manager of software maintenance: How many? _____
   b. Supervisor/project leader of software maintenance: How many? _____
   c. Maintenance analysts: How many? _____
   d. Maintenance programmers: How many? _____
3. Does your organization have a well-defined maintenance charter with short-range and long-range objectives identified?
4. Are all maintenance requests (user- and DP-originated) logged in a central maintenance request log?
5. Does the maintenance group have a central help desk where the users can call to report problems and ask for clarifications and general help regarding their systems?
6. Are periodic meetings held between the maintenance staff, managers of major applications and users to review work accomplished, work pending and planned maintenance activities?
7. Are there procedures to identify and audit frequently maintained or poor quality reports?
8. Are users restricted from approaching maintenance staff directly to request maintenance to programs?
9. Are there procedures to ensure that program documentation (external and internal) is updated to reflect the maintenance effort?
10. Are there any programs in this system that have reached the 'untouchable' state (the maintenance staff is afraid to even touch the programs lest they fail completely)?
11. Does your organization currently have a well-defined maintenance reduction plan?
12. To what extent does your department currently face the following problems:
    a. Unstable hardware environment.
    b. Unstable system software.
    c. Ongoing training unavailable.
    d. Poor relationship between operations and programming staff.

Figure 3

ITEM NO.	EVALUATION ITEM	YES/NO N/A	EXTENT OF PROBLEM
1.	Is there an up-to-date program functional description?		
2.	Is there an up-to-date maintenance history log formatted according to standards?		
3.	Are all of the called programs described (functional descriptions)?		
4.	Are any records processed in the File Section areas?		
5.	Are data items in working storage grouped:		
	a. Functionally?		
	b. Alphabetically?		
	c. At random?		
6.	Are redefined items clearly annotated to describe the reason/purpose of redefinitions?		
7.	If a table is used in more than one program, is the table description copied into each program?		
8.	Is there only one I/O routine for any given file?		
9.	Are the nested IFs properly aligned, paired and kept within limits of readability and ease of maintenance?		
10.	Are there any complicated and negative Boolean logic expressions?		
11.	Has readability and maintainability been sacrificed for the sake of efficiency and in the name of 'structured' programming?		
12.	Does the program contain any verbs (in any of the four divisions) marked for deletion from the Ansi compiler?		

Figure 4

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1. DP and user management are extremely concerned with this disproportionate rise in maintenance cost and are attempting to do all they can to stem the tide.

2. Because the majority of DP resources are committed to maintenance, effective tools, techniques, methodologies and education are easily available in the marketplace through vendors, universities and in-house.

3. Personnel assigned to maintenance are of the highest quality and enjoy substantial visibility, along with commensurate financial and professional rewards.

'There are practically no maintenance analyst and maintenance manager job classifications in the DP field — a fact totally contrary to other engineering fields.'

4. Due to the massive amount of existing software requiring maintenance and improvement, companies have (or soon will) put in place rigorous software rehabilitation and improvement plans.

To the contrary. The sad facts are:

1. DP management, though concerned with the inordinate resources consumed by maintenance, devotes little effort to remedy the situation. Typically, its response is limited to moaning and groaning with occasional, short-lived stabs at correcting the problem.

2. Major portions of all the recently developed tools, techniques and methodologies are limited to the definition and development phases of system life cycles.

3. It is a common, though misguided, belief that the software engineering techniques are not applicable to software maintenance.

4. Very few DP organizations have seen fit to staff their maintenance departments with high-quality, senior-level programmers, analysts and project leaders. There are practically no maintenance analyst and maintenance manager job classifications in the DP field — a fact totally contrary to other engineering fields.

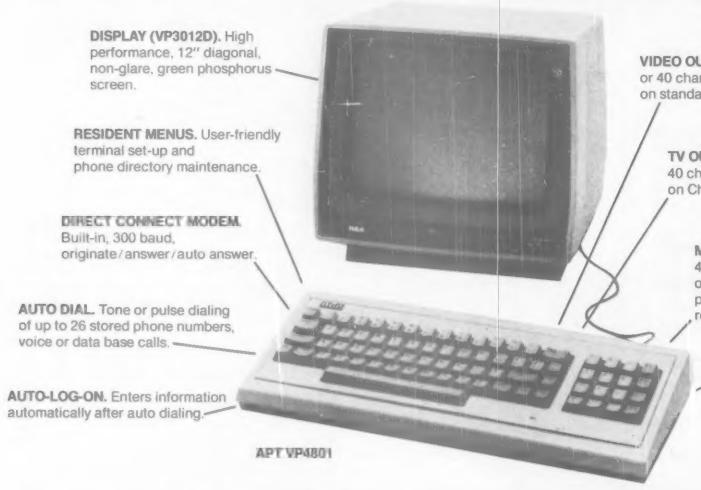
5. A survey of 32 DP managers revealed that only three had implemented rehabilitation plans ("Maintenance Reduction — In Search of a Unicorn," G.K. Kapur, Software Productivity Conference, Carmel, May 1982). When asked, "Do you believe your organization would benefit from such a plan?" 28 replied "yes," two responded "possibly" and two said, "Yes, but it would be hard to convince the users."

Another question in the same survey was, "What percent of your organization's existing software needs to be rehabilitated?" The responses were:

No. of Responses	% Needing Rehabilitation
1	20%
3	40%
10	50%-60%
7	60%-70%
8	80%
3	All of it

We can safely summarize: Maintenance has been, and still is, treated as a necessary evil, often delegated to a group of trainees and junior programmers.

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In an effort to gain an insight into the specific causes for the high cost of maintenance, senior maintenance programmers from 14 DP organizations were asked to rank the problems contributing to high maintenance costs as shown in Figure 2 (on In Depth/16). Their responses are tallied in the column to the right.

Analysis of the responses raises important questions:

1. How many of these problems were present when the programs originally went into production?
2. How many of the problems result from work by maintenance programmers?
3. Do the original authors and maintainers contribute to these problems deliberately, due to carelessness, or because they don't know any better?
4. Are DP managers aware of these problems?

- If yes, why did they allow them to happen in the first place, and why do they allow the situation to continue?
- If no, are they really managing?

Similar research, corroborating our findings and conclusions, has also been conducted by Dr. Ned Chapin and was reported in the proceedings of the 1981 National Computer Conference.

Abdicating Responsibility

Should we conclude that DP management has abdicated its responsibility for effective management of software maintenance?

Many of today's managers and supervisors are, directly or indirectly, responsible for the current state of software maintenance. It was under their supervision, and in many cases by their own work, that today's code was developed.

Having to come face to face with huge stacks of poor code can be a rude awakening, and to accept the responsibility for fixing it may be interpreted as accepting the blame for causing it. As a result, the problem is often swept under the rug.

A quick review of problems 1 through 8 in Figure 2 shows that these are under the direct control and responsibility of DP management. Then why haven't they been controlled? Discussions with a number of respondents to the problems listed in Figure 2 revealed some possible reasons:

1. Lack of direct supervi-

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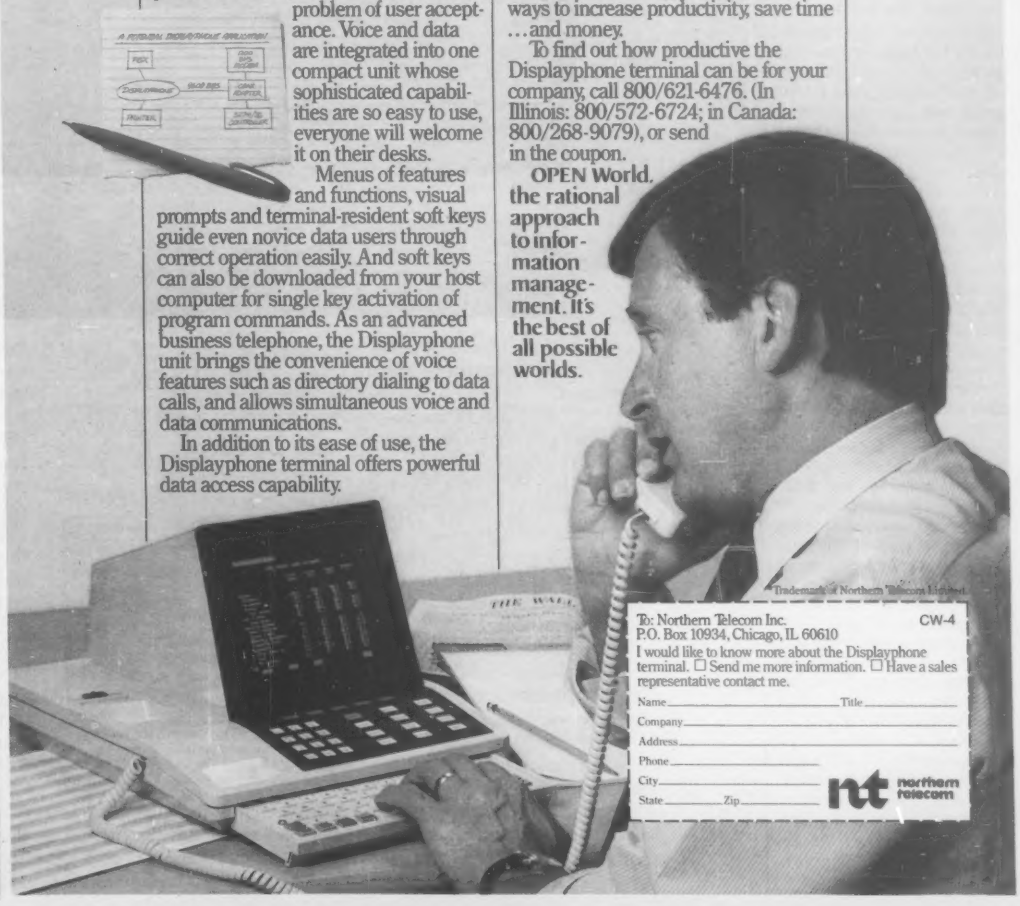
In addition to its ease of use, the Displayphone terminal offers powerful data access capability.

It is an asynchronous terminal that can also be configured to operate in IBM 3270 and other sophisticated computer environments. This flexibility gives users high speed access to a full range of corporate and public data bases.

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IN DEPTH

sion of program design, development and testing phases. How many first-line managers actually ever review the design and read the source code?

2. Lack of well-defined and adequately enforced standards, procedures and guidelines.

3. Mistaken belief that programmers will quit if asked to follow standards, procedures and guidelines.

4. Quick and dirty programming as an easy way out of slipped schedules.

5. The expectation by programmers that they will not be in their current positions by the time their programs go into the maintenance cycle.

It is a shame that persons applying for managerial positions are seldom, if ever, asked the question, "What percent of your current budget and resources are committed to maintenance, and by what percent did you reduce your organization's maintenance cost?"

Users Share Blame

Of course, not all the blame for high maintenance should fall on the shoulders of DP management. We know that users don't define their needs well, don't project far enough into the future, change their requirements even as the programs are being tested and often force unreasonable delivery schedules.

It is ironic that the people who eventually foot the bill for DP services are not fully cognizant of the maintenance problems, seldom inquire about their causes and almost never press for long-term solutions.

The same users who control the maintenance costs of their manufacturing plants, automobile fleets and heating and air-conditioning systems somehow completely ignore the cost of software maintenance. In fact, a stumbling block in the path of software rehabilitation is user apathy combined with a reluctance to support the cost of software rehabilitation. The often-heard response is, "We did not write this bad code in the first place, so why should we pay for its rehabilitation?" Although these arguments may have substantial merit, DP management cannot undertake corrective actions unless supported by the user community.

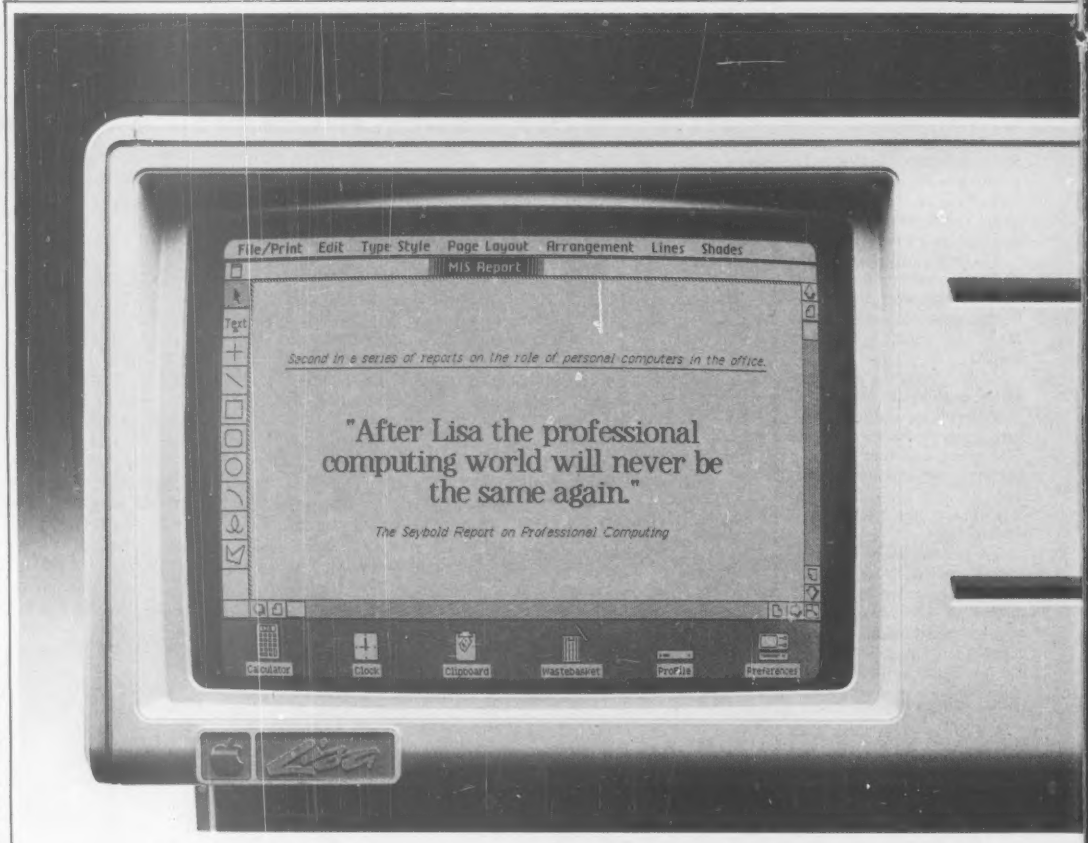
It is obvious that there has been much neglect both by DP management and users. However, an interesting question is: How many of the problems numbered nine through 22 in Figure 2 are actually the responsibility of the original authors and maintenance programmers?

Course of Action

It is painfully clear that the industry needs a well-planned and effective method to attack the ever-growing problem of software maintenance. It simply is not practical to throw away the billions of lines of existing code and start fresh.

Over the past five years, a number of DP organizations have reduced the cost of maintenance on their existing software through a maintenance reduction plan.

The plan can be defined as an organized set of proce-



Apple's new Lisa™ is the world's most powerful personal computer.

Its 32-bit MC68000 microprocessor gives it the processing capability of a mid-range mainframe.

It also has one million bytes of internal memory. And, with a 5-Megabyte hard disk, more than 15 times the on-line mass storage of standard microcomputers.

Given these most imposing credentials, one could get the impression Lisa was designed solely to scare one's socks off.

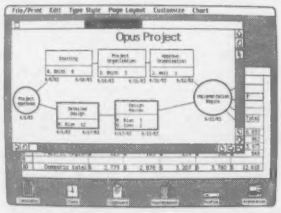
On the contrary.

What makes Lisa totally revolutionary is that, for the first time, all this phenomenal power is contained in a business computer you can learn to use in under 30 minutes.

200 years of hard work made it easy.

To tell Lisa what to do, all you have to do is point.

But achieving this simple concept required a totally new approach to software and 200 person-years of development.



Lisa's revolutionary software lets users perform several applications simultaneously, even "cut" and "paste" them together. The powerful project management program seen here is a Lisa exclusive.

Lisa replaces complex computer commands with symbols familiar to anyone who's ever worked at a desk.

Even someone who's never touched a computer before can learn Lisa in under half an hour. Versus the 20 hours or more required to unriddle conventional PCs.

To information managers, that means dramatically reduced training time and increased productivity.

But people don't just learn faster on Lisa, they also work faster. Each of Lisa's powerful applications* use symbols and commands common to all. So with little practice, users can move from LisaCalc to LisaGraph to LisaWrite without missing a beat. Or use them all at once, "cutting" information from one program and "pasting" it directly into another.

dures to upgrade and rehabilitate existing software in order to reduce the maintenance cost.

The plan consists of three phases:

Phase 1: Maintenance management audit.

Phase 2: Software system audit.

Phase 3: Software rehabilitation.

The audit of maintenance management is conducted through the use of a comprehensive questionnaire and a series of interviews designed to evaluate the true state of the maintenance effort.

The eight-part questionnaire contains material about the following areas:

1. Maintenance logistics.
2. Maintenance organization.
3. Maintenance management.
4. Maintenance audit.
5. Maintenance procedures.
6. Major system audits.
7. Maintenance reduction plan.
8. Satisfaction level evaluation.

A partial list of questions from these eight areas is shown in Figure 3 on In Depth/17 (the entire list contains 101 questions).

Upon completion of the questionnaire and interviews, in-depth analysis and evaluations are used to develop a diagnostic study providing management with an assessment of the software maintenance function.

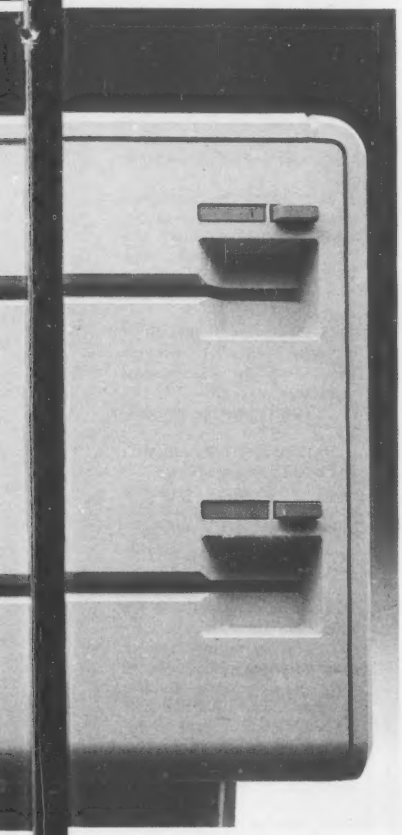
The second phase, a software system sudit, consists of the following three steps:

1. A preliminary system audit: The objective is to develop an overall view of the existing system documentation and a judgmental view of the system from user and DP points of view. Key areas of focus are system architecture, expected life cycle, quality of data files and data bases, system maintainability, reliability and efficiency. A maintenance request log is also constructed.

2. Preliminary program audits: The objective is to gather high-level (functional) information on all of the programs in the system. The key areas of focus are a list of all programs, their functional narratives and high-level data flow (I/O) diagrams. Other key criteria are: Do they do their job, are they reliable and what does it cost to maintain them? Programs that have deteriorated to the "untouchable" state are also identified. All of the programs are assigned preliminary quality ranking values.

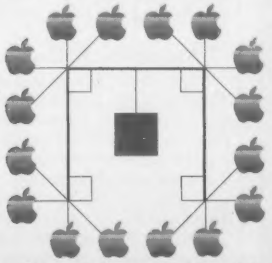
3. Detailed program audits: Programs are selected for detail audits taking into consideration their preliminary quality ranking value (from step 2 above), frequency of run, mean-time-to-failure and the size of the maintenance backlog. Four documents are used to conduct detailed program audits. The key document used to evaluate the programs is a checklist, selected questions from which are shown in Figure 4 (on In Depth/17). The "extent of problem" ranking of each item helps identify quality hot spots.

This checklist is also strongly recommended for use on every new program. It is important to note that the evaluations should be done and hot spots attended to



There's even a program – LisaProject – that lets you use the mouse to chart the progress of complex projects, automatically recalculating when deadlines or resources change.

On paper, Lisa is just as exceptional. With its dot matrix and daisy wheel printers, it produces printed materials just as you see them on the screen.



AppleNet, available soon, will let Lisas and other Apples share information, and costly peripherals.

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Any Lisa system can become part of a powerful Lisa network through AppleNet, our own low-cost local area network.

It will enable a user to transfer documents from one department to another, so they can be rapidly reviewed. Or modified. Or passed on to other Lisas.

The same network will allow Lisas to branch out to other Apples.* Or share disks, printers and other costly peripherals.

Using the LisaTerminal program, Lisas can tie into mini, mainframe and other personal computers by emulating VT 100-type terminals. Or, using the Apple Cluster Controller, it can also emulate 3270-type terminals.

In short, one Lisa can do the chores of many terminals. All of which means swifter response times and better distribution of resources.

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*With more programs on the way, Lisa's library now includes LisaCalc electronic spreadsheet, LisaList data base, LisaWrite word processing, LisaGraph business graphics, LisaDraw presentation graphics, LisaProject electronic project management and LisaTerminal data communications. For information regarding corporate purchases through our National Account Program, call **(800) 538-9696.** In Canada, call (800) 268-7796 or (800) 268-7637. Or write to Apple Computer Inc., MIS/EDP Marketing Dept., 20525 Mariani Ave., Cupertino, CA 95014. © 1983 Apple Computer Inc.

IN DEPTH

before the program goes into the unit testing phase. This process will assure high-quality programs and help avert the maintenance problems so prevalent today.

The third phase, software rehabilitation, consists of the following steps:

1. Individual program rehabilitation. This step encompasses facelifting (pretty print), restructuring, retrofitting, logic simplification, documentation update, error correction and application of selected maintenance requests. Selected programs (with very low quality ranking) become candidates for rewrites.

2. Detailed system rehabilitation. The next step is to complete/update system-level documentation; draw up-to-date system flow or data flow diagrams; cross-reference programs to files and reports to programs; catalog common file/record descriptions; list all tables with cross-reference to programs and similar system-level documentation essential for smoother system operation.

3. Program reaudits. Programs that had very low quality ranking before going through individual program rehabilitation are usually reaudited to ensure that their (post-rehabilitation) quality is now acceptable and that individual hot spots within the programs have been corrected.

A maintenance reduction plan such as the one summarized here can reduce the percentage of staff time spent on software maintenance from a high of 80% to a low of 30%.

Benefits DP organizations have experienced through the use of the maintenance reduction plan are:

1. High software reliability.
2. Considerable reduction in maintenance backlog.
3. Improved response time to change requests and error corrections.
4. Significant improvement in user satisfaction.
5. Improved productivity with more staff available for new development.
6. Higher morale among maintenance staff because they contribute to making systems more reliable and easy to maintain and to reducing maintenance costs.

The software maintenance function can be rehabilitated if the same engineering principles that are applied to restore/rehabilitate machinery, buildings and factories are applied to existing software. Data processing management must act quickly to develop a maintenance reduction plan and commit adequate resources, users must approve funds and the maintenance staff must restore the software to high quality.

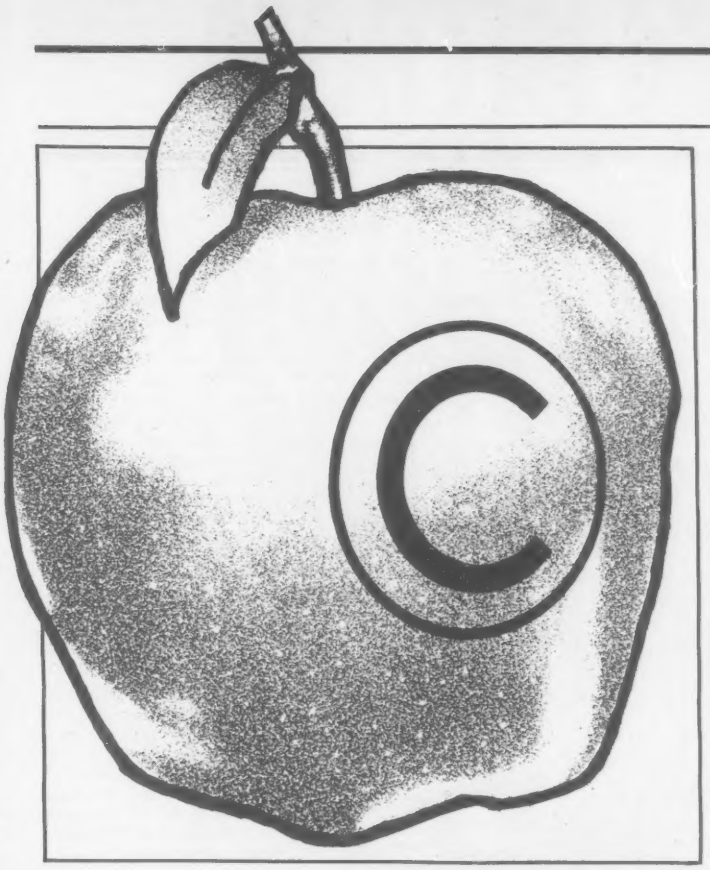
The same principles must also be embraced by the development staff to ensure that history does not repeat itself.

About the Author

Gopal Kapur is president of Kapur Associates, Inc., information systems consultants in Danville, Calif. His firm specializes in software rehabilitation and managerial effectiveness.

In May, Kapur received a distinguished achievement award from President Giani Zail Singh of India for his contributions to data processing education and management.





A Hard Stand for Software Protection

By David A. Savner And Barry D. Weiss

Software authors and producers rightfully want to know what legal protection is available for their programs and systems. The software industry's own effort to protect products from pirates slows growth and productivity while simultaneously forcing higher pricing.

In general, recent legal developments have made it easier to protect programs. Perhaps the most important news for software authors is the Aug. 30 decision by the Philadelphia Federal Appeals Court in the case of Apple Computer, Inc. against Franklin Computer Corp. [CW, Sept. 12]. This case solidified the view that computer programs are generally copyrightable.

Apple sued Franklin for copying copyrighted Apple II operating system programs. Some programs were in read-only memory (ROM), some were on disks and some were written in a manual. Some were in source code, others in object code. The Federal Appeals Court agreed with Apple that Congress intended copyright to extend to all computer programs regardless of how or in what medium they are expressed.

By the terms of the Copyright Act, computer programs can be protected as "original works of authorship" when they are "fixed in a tangible medium." "Original" simply means not copied from another program. "Tangible medium" would seem to include writing in a manual, code on floppy disk or code in a ROM chip. A number of court cases dealt with whether the type of code language or the type of medium restricts the availability of copyright. The consensus favored Apple.

Earlier cases ruled that programmed ROM chips in video games were copyrightable. Such ROMs differ from Apple's in that video game ROMs directly generate human-readable displays, whereas Apple's operating system ROMs perform internal housekeeping chores.

Franklin's contention that this difference was crucial was not persuasive. The Copyright Act specifically permits copyright of works that require the help of a machine to "express"; further, coded works have been held copyrightable by courts for decades.

The basic policy here is that the work need not be understandable or intelligible to everyone or anyone to be considered an original work of authorship.

Franklin said it had copied Apple's programs to achieve full compatibility with Apple and thus capitalize on the tremendous market in Apple-compatible peripherals and software. There was some evidence that outright copying was not Franklin's only solution. Moreover, Franklin's economic motives did not change the fact of illegal copying.

Franklin, though, has a pending countersuit charging that Apple has abused its copyrights in order to monopolize this market. The court has correctly ruled at this point that Franklin's antitrust argument does not affect the validity of Apple's copyrights.

Copyrights and patents, of course, do grant limited monopolies to the producers of qualifying

IN DEPTH

creative work to encourage further discoveries, inventions and developments. Yet, as evidenced by Franklin's position, the standards for allowing such monopolies inherently produce some tension with the antimonopoly policies of antitrust law.

For purposes of copyright, the court refused to draw a distinction between source code and object code, between applications programs and operating systems programs and between programs that were written and programs that were encoded on ROM chips. Franklin argued that programs on ROM chips are part of the electromechanical processes of the computer. Processes are sometimes patentable but never copyrightable.

Apple, however, had not sought to copyright the ROM chips themselves, only the programs "written" on the chips. Originally, the lower federal court expressed "some doubt" that programs in object code on ROMs could be copyrighted, but the appellate court made clear that they could be. With the primary issue thus settled, the case now goes back to the district court for further consideration of Apple's infringement claim and its request for an injunction restraining Franklin from using, copying, selling or otherwise infringing Apple's copyrights.

Intellectual Property Law

The question is how to secure "intellectual property law" rights — such as a copyright — in computer programs to deter would-be pirates. The difficulty has been in trying to fit computer technology into the existing legal framework.

Several legal devices lie under the umbrella designation of intellectual property law including patents, copyright, trade secrets and restrictive licensing agreements. Each of these, alone or in combination, may be useful for a particular software product.

For example, trade secret and restrictive licensing agreements are most useful where the software producers and end users are in direct contact by contract. The producer will typically require the purchaser to agree not to make unauthorized copies, nor to bootleg or divulge the programs.

In the case of trade secret agreements, the producer must take steps to maintain secrecy. If the purchaser violates the agreement, the producer can hold him liable in a lawsuit for breach of contract. Rights and remedies in this area are a matter of state law.

Trade secret and restrictive licensing agreements are less useful for widely distributed programs. Mass marketing means that secrecy becomes logistically harder to maintain; it becomes harder to control the customer's end use; and contract restrictions may actually make a program less attractive to potential consumer users.

In fact, some software vendors have found that licensing restrictions may cause more lost sales than prevent piracy. Texas Instruments, Inc., however, is currently experimenting with an innovative licensing



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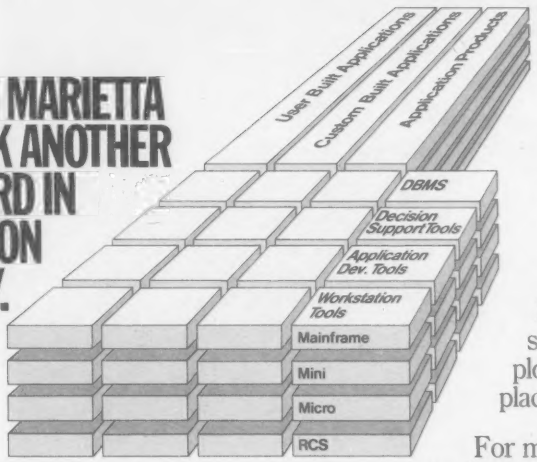
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arrangement for its software packages.

On the other hand, patent and copyright protection are well suited for mass-marketed software. Recent court decisions such as Apple vs. Franklin have made clear that virtually all computer programs are copyrightable. Further, both the Patent Office and the patent appeals court have adopted a more liberal attitude toward granting patents on most computer programs.

'Copyright and patent are not mutually exclusive. For some computer systems, patent protection may dovetail with copyright — a patent will protect the idea and copyright will protect the expression of that idea.'

The difference between what may be patented and what may be copyrighted is rooted in the Constitution and further delineated by federal statutes. Essentially, certain novel ideas, processes or methods may be entitled to patent protection. The patent holder enjoys certain exclusive rights to the use of the patented idea, process or method. Copyright, on the other hand, secures certain exclusive rights in the author's particular expression of ideas, but not in the use of the underlying idea.

Copyright and patent are not mutually exclusive. For some computer systems, patent protection may dovetail with copyright — a patent will protect the idea and copyright will protect the expression of that idea.

Copyright Protection

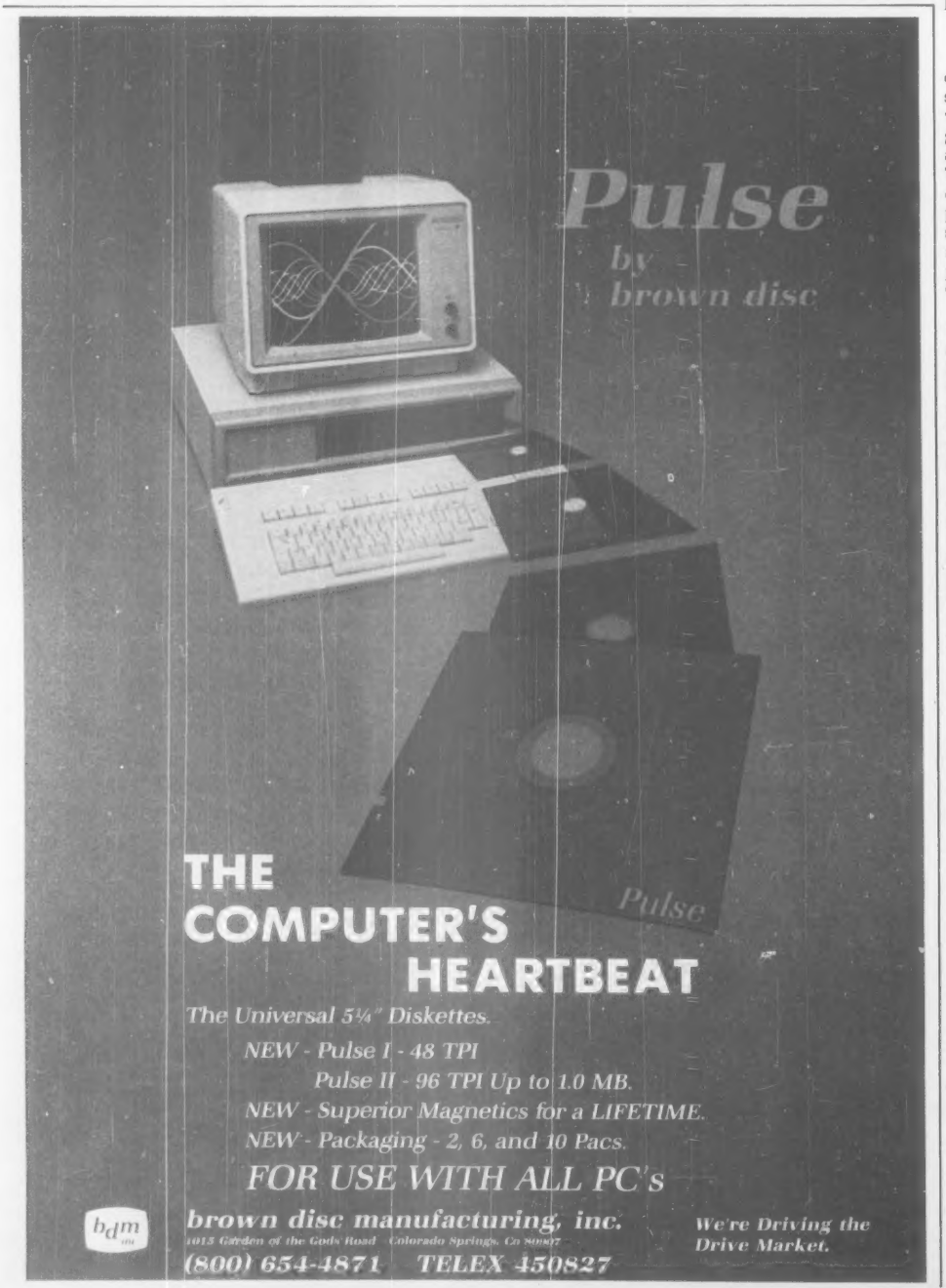
Currently, a copyright is easier to obtain than a patent, and for this reason it has been recommended for all widely marketed computer programs. The advantages of copyright are many and the drawbacks few. The statutory and regulatory procedure for obtaining full copyright protection is relatively simple and straightforward. The basic requirements are notice of copyright and deposit and registration with the U.S. Copyright Office.

Copyright notice should be affixed to all forms of the program that might be perceived by human beings, that is, flowchart, source code, object code, ROM chip, floppy disk, package and any display generated onto a terminal. In addition, software documentation and instructions are generally copyrightable.

Once copyright is obtained, the copyright holder maintains exclusive rights to copy and prepare derivative works or translations. Copyright lasts for the author's life plus 50 years, or, if the program is a "work made for hire," for the shorter of 75 years from first publication or 100 years from creation. This period is obviously long enough to take full advantage of a program's profit potential.

A noticeable advantage of copyright for widely marketed software is that copyright will be enforced uniformly nationwide and to some extent internationally. Trade secret and licensing restrictions may receive different treatment from the courts of each locale. Remedies for copyright infringement may include money damages, attorneys' fees, court orders to seize and destroy illegal copies, court orders to prevent the making of further copies or even court orders to prevent the importation of illegal copies. Lawsuits to enforce trade secrets are usually harder to prove than copyright actions. Copyright infringement is proved by showing that the infringer had access to the protected work and that the infringing work is substantially similar to the original.

Copyright protection is not perfect, however. For one thing, it may be hard to detect isolated acts of infringement. Just as photocopiers and home sound and video recorders have facilitated unauthorized copying of books, magazines, music and films, inexpensive off-the-shelf



copycat software now enables anyone to make illegal copies of programs. But authors of such works are not about to sue everyone who makes a copy.

Copyright alone does not completely protect software because it does not protect the underlying idea, process, method or algorithm, but only the particular expression written by the programmer. Thus, the distinction between ideas and their expression is legally important. If there are very few ways to express a particular idea, then an author could, in theory, copyright every permutation of program instructions which would express that idea and, without a patent, capture the use of the underlying idea. Copyright would be denied, however, in such a case. Most likely, one could not copyright a subroutine consisting of a few steps.

Only an expression of ideas may be copyrighted. But the idea or process itself is not copyrightable. For example, a novelist can copyright his novels, but he cannot copyright his ideas for the story line.

Depending on the type of software, the idea may be more valuable than the particular expression. When a software house spends a large amount of time and money researching and developing a method that it incorporates into a program, it would prefer to maintain exclusive rights to the method in order to recoup development costs fully and still make a profit.

Consider the expense to develop an integrated user-friendly package. Methods, as noted above, are not copyrightable. But this is where the recent patent law trend gives rise for optimism.

Patent Protection

A 1981 U.S. Supreme Court decision had suggested that only software systems that directly controlled machinery could be patented. Such a limitation would probably exclude most applications software. But the Patent Office recently granted a patent on a securities brokerage cash management software system. This action, coupled with liberal patent court rulings, indicates that patent protection could extend to most software systems. Nonetheless, the processing time for patent applications — typically three years — makes patents a rather impractical peg for most software producers to hang their hat on, given the rapid pace of computer industry development.

Although some systems will qualify for both a copyright and a patent, it remains unclear whether copyright can be used effectively in conjunction with trade secret protection for custom installations and narrowly marketed systems. Copyright registration (which is a prerequisite to an infringement action) entails depositing some form of the program with the Copyright Office, where it is then available for public inspection. Does copyright deposit preclude a programmer's claim of trade secrecy when the public has access to the program?

Under current regulations, the Copyright Office requires deposit of the source code format of software because it believes source code better represents authorship than object code. Registration can be had when only object code is deposited, however, the Copyright Office accepts such deposit under its "rule of doubt," which limits future infringement relief. Full public registration creates a legal presumption of copyright validity and is a prerequisite to recovery of statutory damages and attorney's fees. From the programmer's standpoint, depositing source code makes it somewhat more likely that a potential pirate searching copyright records would discern that the program was worth pirating.

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Current regulations also permit deposit of only an "identifying portion" of the program. This situation limits public disclosure, but it might nevertheless destroy the secrecy of a trade secret, thereby barring any action for wrongful disclosure. Because the impact of deposit is uncertain, many attorneys today elect not to copyright software systems that are narrowly distributed under trade secret agreements. The Copyright Office recently stated that it is considering drafting rules that would permit copyright-trade secret compatibility and invited public comment. Congress is also considering the matter.

'Ultimately, we might expect to see some hybrid protection that is neither as easy to obtain as a copyright, nor as difficult to obtain as a patent. This hybrid will certainly not give the lengthy protection of copyright.'

Computer technology has progressed more quickly than the law, but the law is trying to catch up. The discussion above has focused primarily on the effort to adapt existing legal devices to the special problems faced by the software industry. There is also a significant effort under way in Congress to pass laws providing new kinds of protection for software and other computer products.

Because much software and "firmware," particularly programmed ROMs, seems to fall into the gray area along the dividing line between copyright and patent, a new hybrid device may provide the optimum alternative. Indeed, the dividing line between software and hardware is rapidly blurring. Bills proposing new types of protection have already been introduced in Congress. Ultimately, we might expect to see some hybrid protection that is neither as easy to obtain as a copyright, nor as difficult to obtain as a patent. This hybrid will certainly not give the lengthy protection of copyright. It will probably not last even as long as current patent protection. The life span to obsolescence is relatively short in the industry in any event.

After the 1978 report from the National Commission of New Technological Uses of Copyrighted Works (Contu), Congress passed amendments to the Copyright Act in 1980, expanding copyright to software, but still leaving many important issues unsettled. The Apple case has made clear that all programs, including those on ROM, are copyrightable, but debate continues over whether the chips themselves are protectable.

Congress began hearings on the proposed Semiconduction Chip Protection Act of 1983 this past summer [CW, June 6]. The proposed act would provide 10-year copyright protection for semiconductor chip masks, but the copyright holder would be bound to grant license to the work for a reasonable royalty. The bill thus would protect the holder's investment in development without stifling the dynamism of the industry. And this is exactly the balance that must be struck.

Computers and computer software may become our most economically important commodities in the coming years. But as Microsoft, Inc. and Digital Research, Inc. pointed out as "friends of the court" for Apple against Franklin, there must be clear legal protection to ensure that innovators will earn a fair profit to fuel further research and development. The recent trend in the law supports a favorable prognosis in this regard.



About the Authors

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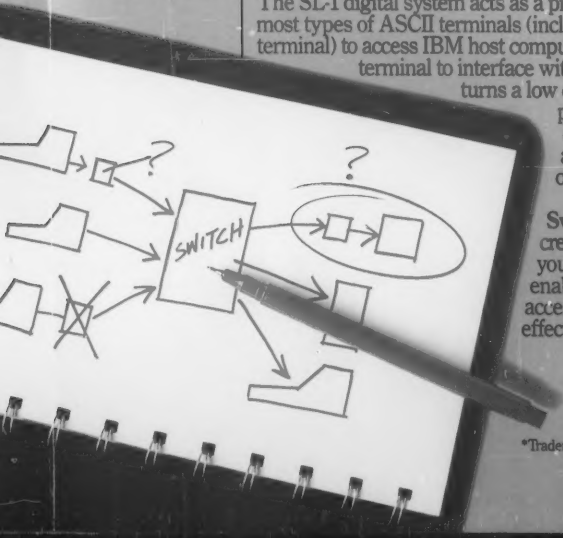
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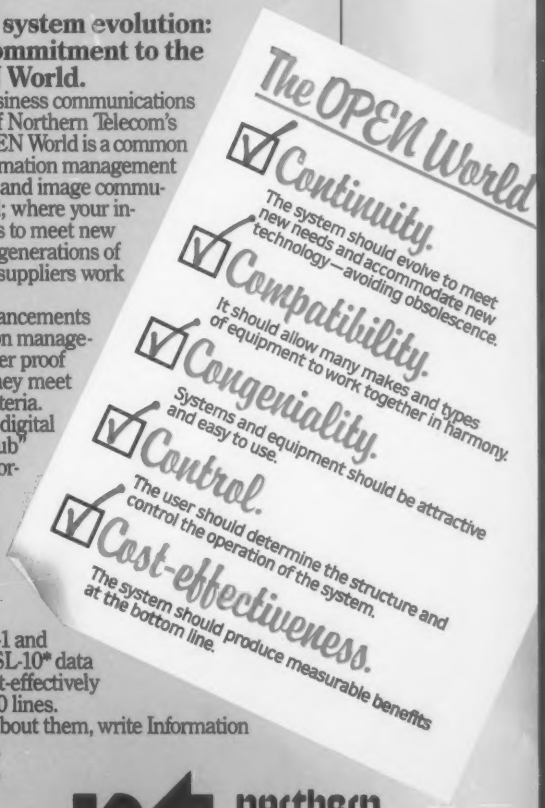
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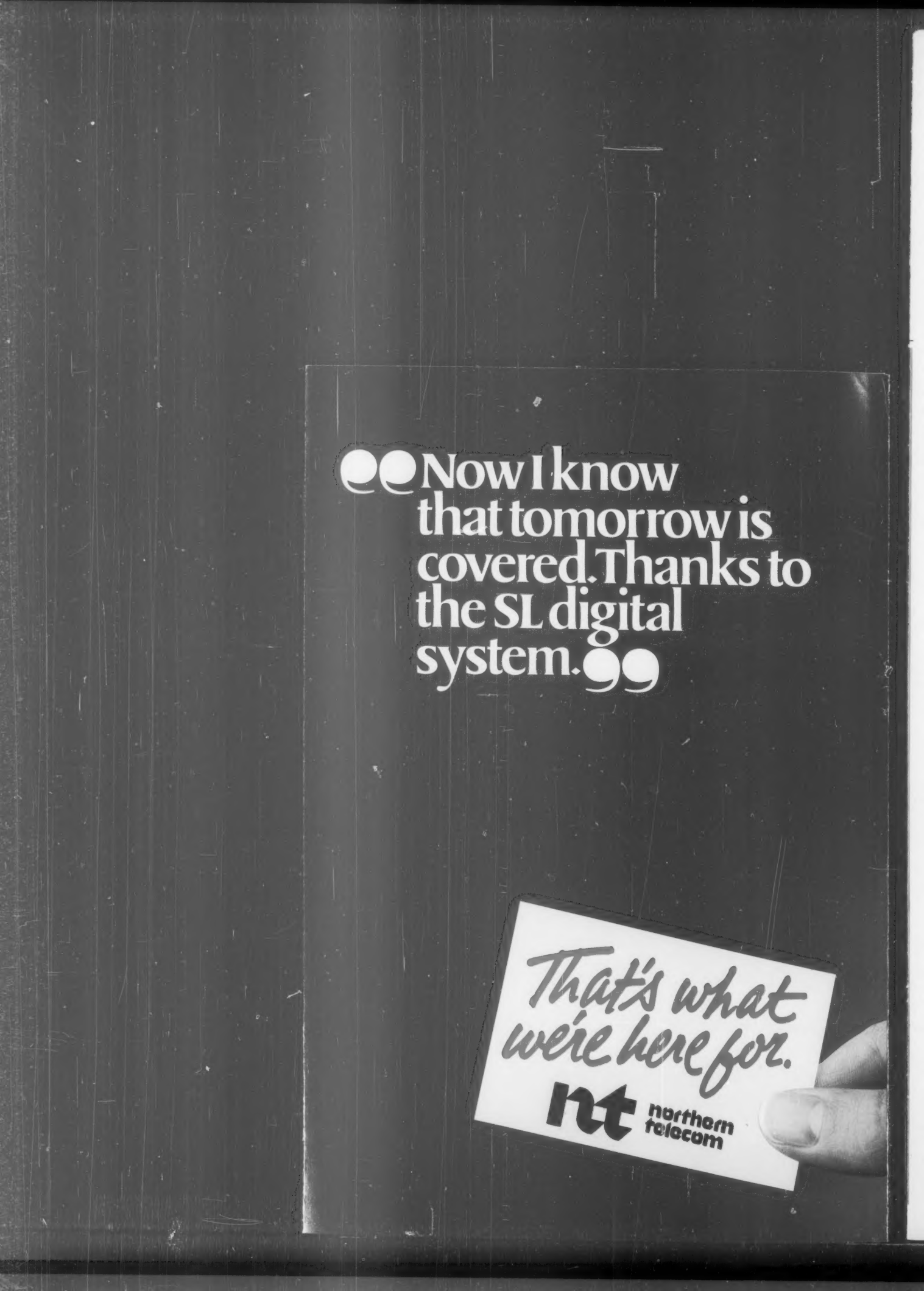
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SPECIAL REPORT

Weathering the Microcomputer Storm



Edited by Ed Scannell and Patricia Keefe

September 26, 1983

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Supermicros Fill Mini, Desktop Micro Gap

By Robert V. Dickinson
Special to CW‡

The traditional computer marketplace has developed in several stages, beginning with mainframes, followed by minicomputers and ultimately desktop microcomputers. Each step of this downward evolution has been characterized by decreased cost and increased user control.

But the traditional boundaries have dissolved as semiconductor technology has continued to provide more power for less money. The lower end is becoming even lower, with desktop (personal) computers becoming increasingly inexpensive and much more widely used. Likewise, minicomputers are encroaching on the high end — formerly the exclusive domain of the mainframes — by providing more and more power for the price.

A new kind of system — the supermicro — has emerged to fill the gap created by these diverging market categories. While the original minicomputer has increased speed and power with new 32-bit architectures, its price remains in the $100,000 range. The supermicro typically sells for less than $20,000.

Furthermore, the minicomputers and the new superminis have another key disadvantage: They almost universally use proprietary architectures and operating systems developed by a single manufacturer. This has served to keep users locked into that vendor's hardware in order to protect an often massive investment in software.

The new generation of supermicros, on the other hand, was designed with open and flexible architectures based on off-the-shelf, 16-bit microprocessors. They typically run an industry-standard operating system (usually Unix) and feature large data bases and multiuser capability. Supermicro users obtain the power of traditional minicomputers at anywhere between one quarter and one half of the hardware price.

'The traditional computer marketplace has developed in several stages, beginning with mainframes, followed by minicomputers and ultimately desktop microcomputers . . . But the traditional boundaries have dissolved as semiconductor technology has continued to provide more power for less money.'

At the low end, desktop microcomputers are becoming more popular and, at the same time, causing major corporate headaches. The proliferation of micros in the office makes the absence of standards — in hardware, software and communications — glaringly obvious.

A desktop computer very effectively gives a user the local ability to process words and data; but it's nearly impossible to coordinate several users, each operating on a different brand of computer, who must work together and share information.

Yet one of the most important advantages of the supermicro derives from the evolution of the personal computer. When the 8-bit desktop computer became popular, so did an entirely new concept — mass-produced, portable software. Because supermicros also can run this vast library of software — and run it in a multiuser environment — they serve to lower total computer cost and increase the ease of computing.

And the supermicro can serve still another role in the microcomputer area, that of shared-resource server. This role will be especially vital as emerging microcomputer networks become more viable and widely used.

Besides offering compatibility with the many new application packages developed for desktop systems, the supermicro has adapted itself to support existing minicomputer software as well. Supermicro vendors have been steadily porting minicomputer application languages to their machines, many of which run on Unix-based microcomputers.

Such a strategy serves to bridge the gap between proprietary and nonproprietary architectures and operating systems. The supermicro is an ideal solution for companies that want to migrate existing minicomputer software to less expensive hardware due to increasing demands from employees for local processing capability.

'While minicomputer vendors are emphasizing their superminis at the high end, they are also making a strong entry into the personal computer marketplace . . . Most of these systems, however, are single-user desktop computers not suited for the large data processing environment.'

Data processing managers in corporate, multiuser environments can now extend computing capability to more users and protect substantial existing software investments without being locked into their original, costly minicomputers.

Unlike smaller desktop microcomputers, supermicros offer the power and flexibility to run technical applications such as Fortran 77 and Pascal without sacrificing performance. In addition to these high-level languages, they offer a number of hardware options, such as floating-point processor boards for computation-intensive applications that traditionally were available only with higher priced minicomputers.

Other available tools allow the 16-bit supermicros to run both Unix and Digital Research, Inc.'s CP/M — the standard operating system of the 8-bit world — so that existing 8-bit applications can be transferred to Unix systems. Supermicro users gain the best of both worlds as Unix's high-speed computing power and multiuser capabilities are tied into the thousands of popular, inexpensive CP/M application programs already on the market.

Interestingly enough, while minicomputer vendors are emphasizing their superminis at the high end, they are also making a strong entry into the personal computer marketplace. Digital Equipment Corp.'s Rainbow and Data General Corp.'s desktop Generation computers are examples.

Most of these systems, however, are single-user desktop computers not suited for the large data processing environment that typifies these manufacturers' other products. As these firms are caught between maintaining compatibility with their older proprietary systems and addressing the newer de facto standards in the microcomputer world, they are leaving the middle ground open to supermicro vendors.

The real key to the success of supermicros is economics. A multiuser system, running lower cost, mass-produced software, yet capable of

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Ability to Expand for Multiple Users

Mini Not in Danger of Being Eclipsed by Micro

By Carl W. Jack
Special to CW‡

Just as the minicomputer has not replaced the mainframe, the microcomputer has not replaced the mini. Despite significant technological advancements that have made it possible for micros to support more than one user and much larger mass storage devices, it may be years before they can handle the highly complex operating systems and large number of terminals and workstations that minis presently support.

In fact, it is still more cost-effective in the long run to purchase a minicomputer to serve as a controller of several workstations or as a processor to front-end mainframe communications than it is to add on associate processors and mass storage devices to the average personal computer.

Consequently, the inherent limitations of the typical personal microcomputer will prevent it from ever taking the place of the minicomputer. Instead, minis will continue to serve as easily expandable resource management processors for multiple users and as cost-effective facilitators of communications with a mainframe.

Perhaps a brief definition of the terms "minicomputer" and "microcomputer" is in order before advancing the argument that minis are here to stay. Although there are no clear boundaries or universally accepted definitions to help distinguish a mini from a micro, a microcomputer or personal computer is usually thought of as a single, microprocessor-based desktop unit designed for a single user.

In contrast, a minicomputer, either comprised of information centers or a group of microprocessors, is generally considered to be a system designed specifically to support multiple users, high-capacity mass storage devices and communications with mainframes.

With these functional definitions in mind, the advantages minicomputers presently offer over the typical microcomputer are clear: faster processing speeds, greater expandability, ability to support large mass storage devices and a wide range of foreign devices and, most important, cost-effective communications with mainframes.

For example, few, if any, microcomputers on the market today can compete with the throughput of a 2 million instructions per second (Mips) minicomputer. The issue of CPU throughput is particularly important to those buyers looking for a system to support large numbers of users on a single computer.

Although add-on hardware and multitasking operating systems have been developed to support more than one user on a micro, adding more terminals to such systems only slows its response time to the point where it becomes too slow for most business environments.

Even those "minicomputers" being produced today using combinations of microprocessors — such as Motorola, Inc.'s 68000 or Intel Corp.'s 80186 or 8088 for the CPU with several support microprocessors to complete a single system — cannot match the speed of the older information center-based minis.

Admittedly, the rumored 32-bit microchips being developed by Hewlett-Packard Co. and Digital Equipment Corp. may soon deliver speeds up to 1 Mips. At this time, however, in the 16-bit arena, microcomputers do not match the CPU processing speeds offered by the average minicomputer.

Expansion capability is another area in which minicomputers offer users much greater flexibility and investment security than microcomputers. The average desktop microcomputer costing approximately $2,000 usually has enough on-board memory to support word processing, some general accounting packages and games, but, due to space limitations, it provides only limited expansion capability.

Now, almost without exception, most business users quickly find that their requirements exceed the physical expansion capabilities of their small micros, especially with regard to memory and the addition of a large number of data storage devices.

In fact, it is not that uncommon to hear about a business that invests up to $10,000 in enhancement products for its micro only to find that it must move to a replacement product or minicomputer once the business has pushed its micro to its limits.

Since minis are larger to begin with and designed with expansion in mind, they are the obvious choice for business users who are looking for a single piece of equipment that has significant memory and mass storage expansion capabilities.

In addition, microcomputers today simply cannot offer the volume of resources that can be supported by a minicomputer. Few, if any, microcomputers presently on the market have the ability to tie together several large 80M-byte to 300M-byte disks.

Also, most micros are severely limited with regard to the number and range of foreign devices with which they can interface, such as printers, modems, terminals and communications devices not sold by the manufacturer that built the system. Minicomputers, on the other hand, can support just about any printer, terminal or other peripheral device made.

Undoubtedly, micros in the future may have resource support and foreign device interface capabilities comparable to today's minicomputers. But for now, users with larger data storage requirements and the desire to select from the widest possible range of foreign devices cannot turn to a micro for a solution.

Without a doubt, minicomputers clearly have an edge over micros in the area of communications with a mainframe. For example, it will be a long time before a microcomputer-level machine will be able to do all of the things necessary to support a sophisticated architecture such as IBM's Systems Network Architecture (SNA) mainframe.

Many micros today, with the addition of integrated software/hardware communications packages, can talk to a mainframe via SNA, Synchronized Data Link Control, IBM 3270 or IBM 3780.

The problem, however, is that most of these packages operate on a one-on-one relationship with the mainframe and require the exclusive use of a line. As a result, micros inefficiently use the costly mainframe's resources when they require it to support communications with only one device per line.

In contrast, advanced minicomputer-based mainframe communications offerings can support many devices with only one line to the mainframe.

With greater processing capabilities and more power than micros, minicomputers can serve as efficient cluster controllers gathering and managing data transmitted to and from workstations and the mainframe over a single line.

Jack is vice-president and general manager of the Commercial Systems Division at Computer Automation, Inc.

'Microcomputers today simply cannot offer the volume of resources that can be supported by a minicomputer . . . [and] are severely limited with regard to the number and range of foreign devices with which they can interface, such as printers, modems, terminals and communications devices not sold by the manufacturer . . . Minicomputers, on the other hand, can support just about any printer, terminal or other peripheral device made.'

Examining the Reasons For the Trend Toward Micros

By Ron Conway
Special to CW‡

Some have argued recently that the microcomputer is making inroads into the minicomputer's market in the same fashion the mini impinged upon the mainframe's marketplace.

Advocates of this theory point to certain telltale signs as proof: Time-sharing OEMs are renting microcomputers to their customers in place of dumb terminals; traditional minicomputer manufacturers such as Digital Equipment Corp. and Data General Corp. are introducing micros; and, what is perhaps most telling, office system firms such as Lanier Business Products, Inc. and Savin Corp. have become microcomputer customers.

There are three reasons why there has been a trend away from larger systems and toward microcomputers: Micros offer lower costs coupled with greater power; they have standardization of both software and components; and they provide the ability to respond quickly to customer needs.

While minicomputers have grown substantially more powerful, they have done so only for a price. A machine offering five times the power of its predecessor may also have doubled in price from $50,000 to $100,000. Conversely, microcomputers have continued to provide more power for less cost.

Minicomputer vendors have walled themselves into an architectural prison. Proprietary processors and memories built with small chips resist change. A vendor looking to implement the forthcoming 256K-byte memory chips will be forced to go through a major retooling — developing new boards, changing the addressing schema and adjusting the system timing.

Microprocessors, on the other hand, utilize off-the-shelf components that drop in cost as they increase in volume production.

Sixteen-bit architecture from these chips, such as those made by Intel Corp., Zilog, Inc. and Motorola, Inc., have begun to provide performance comparable to the older, more costly minicomputer processors.

The minicomputer's link is not CPU speed, but I/O operations such as the speed at which information can be read from and written to the disk. As a result, typical business applications execute at about the same speed on a Digital Equipment Corp. VAX-11 or a Hewlett-Packard Co. HP 3000 minicomputer as on an Altos Computer Systems, Inc. 586 microcomputer.

Intel's newest chip, the 80186, is able to lower cost by replacing system components such as the clock generator, the interrupt controller and two direct memory ac-

(Continued on SR/6)

Information Center: Support for Micro Policy

By F. William Guerin
Special to CW‡

The most critical issue among several serious issues facing data processing managers is the need to bring order to personal computing within their organizations. DP can best achieve this objective by developing a structure that addresses issues raised by the corporate personal computer user in a way that is meaningful to the organization.

Creating the framework should begin with a study of current personal computer applications within the organization. Typically, end-user computing falls into two major categories: traditional and microcomputer applications.

Traditional uses include financial planning and data base management. Microcomputing applications include less complex forms of financial planning in the form of spreadsheets, as well as word processing, data base management and graphics.

After end-user computing has been analyzed, DP has completed the groundwork for developing a description of what services should be provided by the department. Chief among these services is in-house support of personal computing applications, usually in the form of an information center.

The information center, a concept developed by IBM, is a subset of the DP department, whose charter is to provide end users with computing tools and access to the data necessary to solve their departments' business needs. According to IBM's L.W. Hammond, the fundamental goals of the information center are to provide proper education, technical support, usable tools, data availability and convenient access to the system so that users can satisfy their business requirements.

The service provided by the information center actually falls into many distinct categories. For example, Ferrin Corp. recently developed an information center business plan for one of its clients, a San Francisco-based processed food concern.

The review indicated the client's information center should offer the following services, which are typical for most organizations Ferrin has researched: implementation and feasibility advice, product acquisition advice and assistance, installation assistance, end-user training (both in awareness and technology), managerial, product and program support and ad hoc consulting.

In most cases, establishing an information center requires approval from senior management. At this point, DP needs to be able to talk in management's language.

The request should be a formal business plan that defines the information center's function, as well as the roles and responsibilities of those who will staff it.

Not only will this document lay out exactly what the information center plans to accomplish, but it will also be a yardstick with which to measure the information center's success.

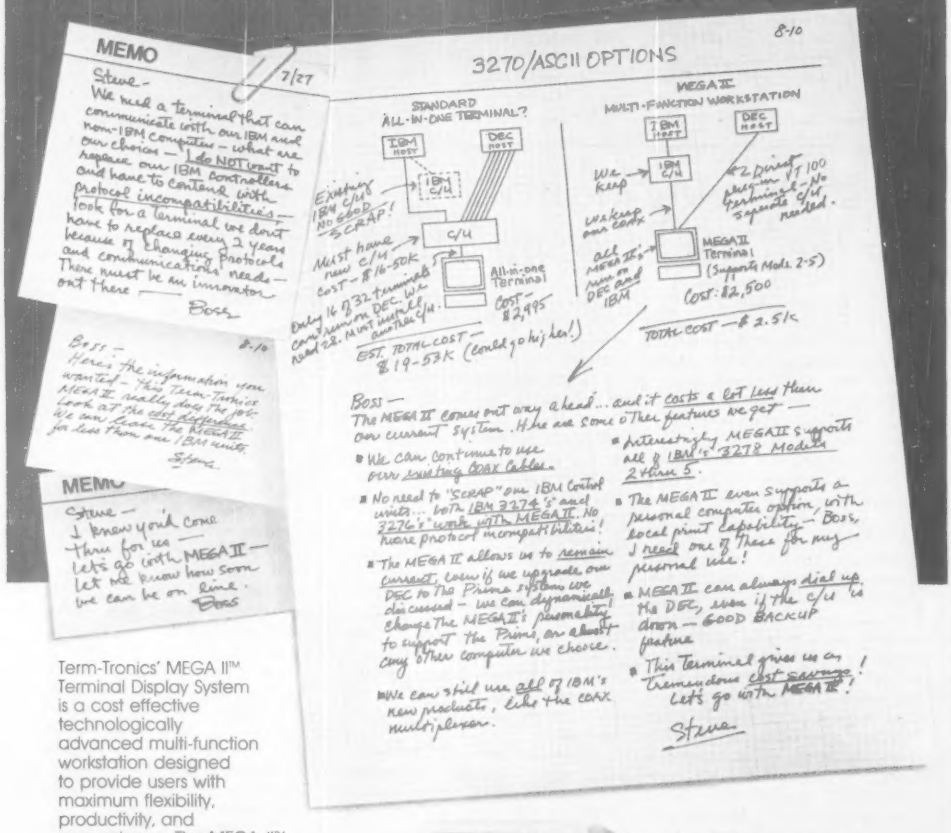
Most DP personnel do not hold Harvard University MBAs, but this is a place where it pays to think in senior management terms. Data processing should supply management with a structured business plan with cost justifications, cost/benefit analyses and the like — something that may be out of the scope of data processing.

After the information center has been justified, staffing will be a major concern. While DP typically has been concerned more with tools and applications for mainframes and minis, the end user is more con-

(Continued on SR/8)

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Supermicros: An Alternative To Minis, Micros

(Continued from SR/2)

high-speed, specialized applications, is now affordable. This is evidenced not only by the fact that many existing large-system applications are being ported to supermicros, but, more importantly, by the fact that many new applications are being computerized for the first time.

The supermicro can also reduce the user's cost of tying into time-sharing networks by providing local processing capability. Users of Data Resources, Inc.'s Drilink systems, for example, can manipulate econometric information locally on a Zilog, Inc. System 8000 supermicro — at a cost lower than that of using a remote mainframe. And mainframe data is still accessible when needed.

Today's computer market offers the user more variety. For the traditional business, supermicros solve a great many multiuser needs.

Dickinson is vice-president and general manager of the Systems Division at Zilog in Campbell, Calif.

Applications for Both Systems

Revenues Still Growing for Mainframes, Micros

By Stephen S. McClure
Special to CW‡

A popular theme of a few years ago held that the mainframe business was dying. More recently, with the explosive growth of micro-oriented desktop computers, this theme has shifted a bit so that now the minicomputer business is said to be dying. As Mark Twain might have commented, the reports of their deaths have been greatly exaggerated.

Mainframes, minicomputers and desktop computers all have applications — some traditional and some emerging. Revenues from all three categories are growing year by year.

Why the obituaries? The most plausible reason lies in the shift over time of the percentages of the total worldwide market revenues attributed to mainframes, minis and desktop computers. International Data Corp. (IDC) of Framingham, Mass., projects that the mix will shift from 54%, 30% and 16%, respectively, in 1982, to 30%, 33% and 37%, respectively, in 1988.

Clearly, mainframes and minis together "lose ground" to desktop computers. The same statistics, when viewed in absolute numbers, show growth in all three categories as the total market grows from $33.8 billion in 1983 to $86.8 billion in 1988. The average annual growth rate for each category is seen at 5.8%, 18.9% and 34.6%, respectively.

From this perspective, there is life in all three categories, with nothing dying. Markets simply grow at different rates.

Revolution Under Way?

Many people argue that there is a revolution taking place, namely that personal computers (also referred to as multifunction workstations or desktop/micros) are taking over the world. It is certainly true that continued technological advances in circuit and magnetic-recording technology have allowed desktop systems to attain characteristics associated with the mainframes of a decade ago.

IDC has predicted that later in this decade $7,500 will buy a desktop system with capabilities such as:

- 1M byte to 16M bytes of main memory.
- 20M bytes to 200M bytes of secondary storage accessed as virtual storage under hardware control.
- .5 to 2 million instructions per second processing power (Mips).
- High-resolution bit-mapped color graphics with motion.
- Wideband communications interface capabilities.
- Optional voice I/O.
- Additional new I/O media options.
- Extended resource-sharing options with other systems.

At this level of capability and cost, the productivity gains derived by providing each member of an organization with his own personal computer easily justify the investment.

This is especially true for professionals who earn high salaries. This new desktop resource will support applications not previously automated and will also displace some existing applications now running on minis and mainframes.

The same technological advances affecting desktop computers will be available to minicomputers and mainframes. As the capabilities of minicomputers grow, they will continue to invade traditional applications of enterprise-level mainframes, such as data base management.

Similarly, mainframes will grow to the new levels of capability required for emerging applications such as artificial intelligence and knowledge-based processing.

Enterprise-level and departmental-level applications were major targets for automation in the '60s and '70s. Individual-level applications will be automated during the '80s, and it is this vast, virtually untapped market which will account for the phenomenal growth of desktop computers.

The assimilation and integration within business enterprises of this proliferation of individual-oriented information processing capability is certain to be a major challenge to, and an influence on, the total information processing market.

Investing in a personal computer can probably be justified with standalone applications. Soon after purchase, other opportunities for increased utilization will become apparent.

Major opportunities will be related to shared data and shared work within an organization (department, division and so forth) and extraction

(Continued on SR/7)

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What's Behind the Trend Toward Micros?

(Continued from SR/3)

cess channels, all of whose functions were formerly handled externally.

Disk drive technology has also helped launch microcomputers into the business arena. Indeed, the small Winchester disk has removed the minicomputer's remaining advantage — the availability of inexpensive off-line storage.

The Winchester has benefited from denser tracking, a more economical design for head-positioning and from smaller packaging costs, shrinking from 14 inches to 8 inches to 5¼ inches. The drop per megabyte has been continuous — over $500,000 a decade ago to less than $100 today.

Another advantage of the microcomputer's nonproprietary approach is portability. Unlike minis, each of which has its own operating system, microcomputers have generally stuck with a few standards: Unix (and microcomputer implementations such as Microsoft, Inc.'s Xenix), Digital Research, Inc.'s CP/M, and Microsoft's MS-DOS.

As a result, the microcomputer installation is not locked into software written for a particular manufacturer's hardware, nor is it confined to a single vendor. If a company is running Wang Laboratories, Inc.'s word processor, it must do so solely on Wang equipment.

Moreover, if it wants to expand into accounting packages, the field is limited to software written expressly for that vendor's hardware.

By contrast, the handful of microcomputer operating systems has created an open door on software development for both general packages and packages for vertical markets.

The same standardization carries through to custom-written applications. Although many programming languages do have a standard at their foundation (Ansi 74 Cobol, for example), minicomputer manufacturers have tended to add proprietary enhancements, thereby defeating portability.

In the case of microcomputers, this is much less prevalent. Ryan-McFarland, Inc., for example, has written a compiler for its RM/Cobol that lets it run on virtually any major microcomputer on the market. This saves an installation from having to rewrite all its applications so they can remain compatible with a hardware change.

Over the long run, it now appears that Unix-like operating systems will prevail for multiuser and networking microcomputers. Unix provides software developers with a rich selection of tools, which is a key to creating a large base of applications.

With the increasing availability of commercial compilers, business packages are now emerging in great numbers.

A stumbling block in the path of microcomputer manufacturers has been the origin of their technology. Microcomputers were originally a tool hobbyists bought simply to learn more about them.

This perception of micros as toys still lingers, unfortunately, and the realization has been slow in coming that this technology is capable of providing complete information processing systems.

Local-area networks, for example, allow an installation to expand in much more economical increments than a larger architecture could permit. If a mainframe fills to capacity, the cost of expansion runs into millions of dollars, but with a local-area network, the investment is only a fraction of that.

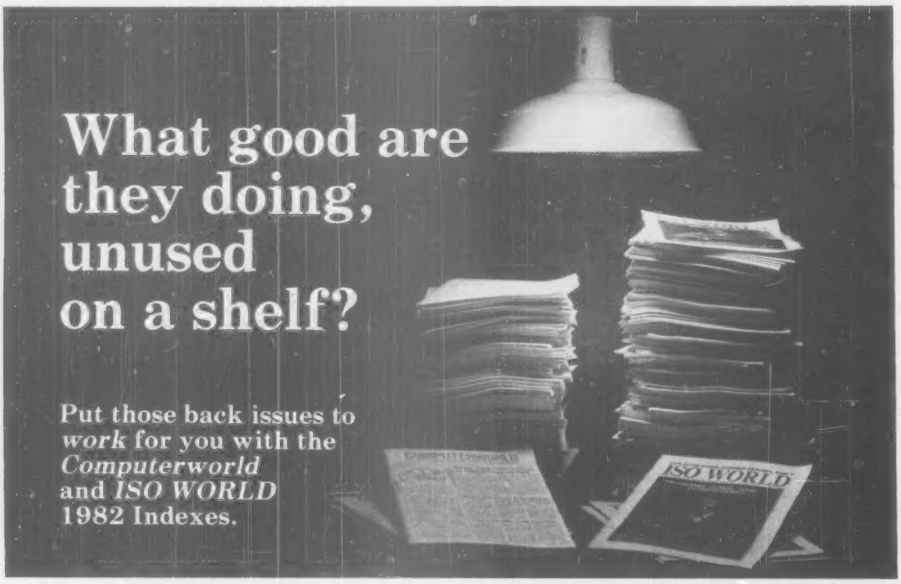
The cost of local-area networks are dropping, and they are becoming easier to use. Xerox Corp.'s Ethernet, which once required a proprietary networking circuit board selling for $2,000 or more, is on the verge of having that technology replaced by a chip set costing around $300.

Maintenance is another critical factor for business systems. National service may be offered in the form of third-party agreements.

With microcomputers, however, it is not always imperative that service be available within hours. When a minicomputer goes down, a company's business can be crippled. But because a single microcomputer carries only a small percentage of the load, a company can continue its operations. Rather than sign maintenance agreements at a steep cost, some minicomputer-based installations simply buy additional micros as spares to have on hand in case of failure.

Finally, there is the matter of delivery. Minicomputer vendors have traditionally been geared to selling to Fortune 1,000 companies, which have settled for a 90-day lead time. Microcomputer vendors differ by being reseller-oriented. As a result, microcomputer companies are better able to respond to sudden demands for their products.

Conway is vice-president for North American sales and marketing for Altos Computer Systems.



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CW	Accounting Systems	101
CW	Disk Equipment	126
ISO	Dealers/Distributors	64
ISO	IBM-PC	84
ISO	Floppy Disks	51
ISO	Modems	45
ISO	Retail Stores	53

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Sixteen-Bit Minicomputers Holding Their Own

By Aug Brown
Special to CW‡

Despite the plummeting prices of 32-bit superminicomputers, both high-end and low-end 16-bit minicomputers continue to thrive in today's market. With the wealth of software written for 16-bit computers, there is no reason to move to a 32-bit machine when replicating most applications.

It is important to remember that users of an application are often unaware of the identity of the computer vendor, let alone the word width of the CPU.

Users with existing software investments in the 16-bit world have a strong desire to protect that software and will continue to use it without alteration.

Software Conversion Expensive

As studies have shown, software costs greatly exceed hardware costs over the life cycle of the application. In many cases, it is expensive and difficult to convert from 16-bit to 32-bit software. Sometimes this is also true for migrating within a vendor's product line.

Another consideration involves the cost of performance. If an application is performance-driven, and not memory-driven, then the 16-bit solution may provide more performance for the same amount of money. Why is this true? If you take the same amount of silicon and organize it into 16-bit circuitry, it will perform better than the same amount of silicon organized into a 32-bit architecture.

In a 16-bit architecture, much of the circuitry can be devoted to processing speed and parallelism as opposed to managing the longer word width and larger instruction set of 32-bit machines.

With a strong demand for traditional and high-end 16-bit systems expected to continue over the next two to three years, the 16-bit market will remain viable. The hundreds of thousands of 16-bit minis shipped by all manufacturers to date have been running thousands of applications without the need for 32-bit functionality. Where the code is written and stable and the software investment has been made, the sales of 16-bit minis will continue to flow.

What about the new software applications that have not been written? Now users must make allowances for their existing 16-bit or 32-bit environment in future software applications.

One must look at the issue of raw performance required in the application and determine if the problem can be significantly enhanced by the large physical address space in a 32-bit world. The application's future direction should be evaluated.

If the price for either system is about the same, and if the 32-bit functionality does not benefit the application, then one 16-bit machine will generally give you more performance and equivalent application growth for a given investment.

However, many users are willing to pay a somewhat higher premium to install new applications in a 32-bit environment knowing that the cost of 32-bit hardware should continue

(Continued on SR/8)

Sales of Micros, Mainframes Still Growing

(Continued from SR/5)

and transmission of data from corporate data bases. It is the additional uses that will foster a good portion of the minicomputer and mainframe demand.

In a personal computing strategic analysis report, the Gartner Group uses the assumption that an additional Mips of central-site processing is consumed for every 60 microcomputers installed.

This additional capacity will be needed to support the processing and data base management requirements of the expanded base of users.

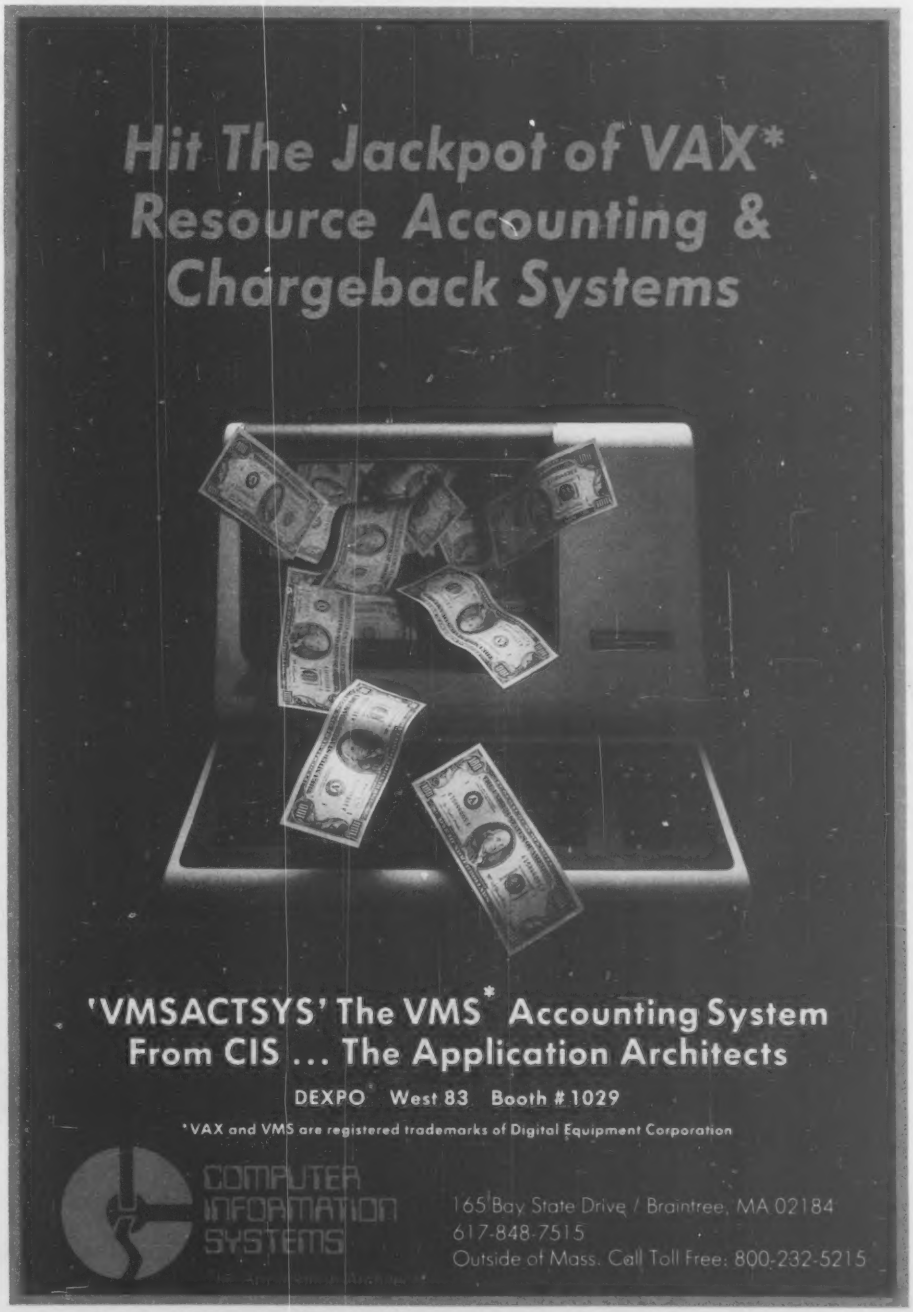
Similarly, using local-area networks to share major resources and to gain access via gateways to central sites and external data bases will increase demand for minicomputers acting as dedicated or multifunction servers.

The Gartner Group estimates that the original $3,500 investment in a desktop computer will eventually result in a total cost to the customer of $22,000 per personal computer.

This splits roughly to about $7,000 for the original desktop computer and its add-ons, $10,000 in minicomputers and $5,000 at the mainframe level.

Clearly, major market opportunities do remain for minicomputer and mainframe vendors.

McClure is manager of advanced systems planning at Honeywell, Inc. in Billerica, Mass.



Information Center Provides In-House Support

(Continued from SR/4)
cerned with business issues.

Information center staffing should reflect the need to address those issues. To ensure that happens, DP should develop profiles of initial staff and define the roles of the information center administrator and other staff members.

For future growth, a log of job descriptions, suitable background characteristics, profiles and possible candidates should be developed, along with recommended recruitment measures and resources.

Once staffing is under control, training will become the most important consideration. DP has long been concerned with mainframes and minicomputers; it must become equally well versed in microcomputers.

Classes exist that will teach DP about specific products, but that is not enough; the department needs sufficient information to be able to recommend a variety of product solutions to end users in the organization, as well as to train them to use the products. If DP has insufficient staff or is unfamiliar with microcomputer products, it may choose to rely on outside consultants for help in this area.

For example, Ferrin has developed a complete educational program with emphasis on training DP staff to support the end user. Training includes courses on how to teach end users and how to support both products and end users, as well as introductory and advanced courses on the products themselves.

Such issues as the personal computer world within large organizations and the evolution of the information center are also a part of the program. Classes on how to support individual products are especially important. These should be more than just tutorials on a particular package and its uses.

Each class should address the advantages and disadvantages of each product, exactly what the product will and will not do and how it differs from other offerings.

With all the word processing packages available, for example, someone needs to define when one is more suitable than another. The information center staff should also be aware of what problems users are likely to encounter with specific products, as well as how to overcome the problems.

As the micro-mainframe connection is made, this becomes even more critical. Data processing should be able to advise when financial planning should be done on the mainframe or when it is more appropriate to use a microcomputer spreadsheet.

A really thorough course will analyze the difference between spreadsheets and financial planning packages and will outline the features of the individual products within each category, as well as point out the strengths and weaknesses of each.

In addition to learning product information, DP needs to be educated in how to train corporate end users. Teaching is not something that comes naturally to most people; someone needs to train them in the fundamentals so that they, in turn, can train the end users.

All of this may seem like an enormous load for a DP department to handle. With the information center and the proper service organization to back it up, however, the DP department has at its disposal all the tools needed to take control of the microcomputers in the organization.

Guerin is president of Ferrin.

Are 16-Bit Minis Losing Ground To 32-Bit Units?

(Continued from SR/7)
to drop dramatically.

The low-end 16-bit market is exploding with the recent introduction of many new desktop computers. The price of these machines is so much lower than the price of 32-bit machines that this market should continue to expand for quite a while.

The new 16-bit systems continue to offer users better price/performance than their predecessors by allowing the same applications to run on lower priced hardware.

Lower priced packaging contributes greatly to the overall lower system price as technological improvements shrink both processor and peripheral design, allowing easier integration into desktop or workstation packaging.

Typically, these machines run the Digital Research, Inc. CP/M 86 and Microsoft, Inc. MS-DOS operating systems, allowing them to take advantage of a large variety of software already written.

Brown is a product manager for Data General Corp., located in Westboro, Mass.

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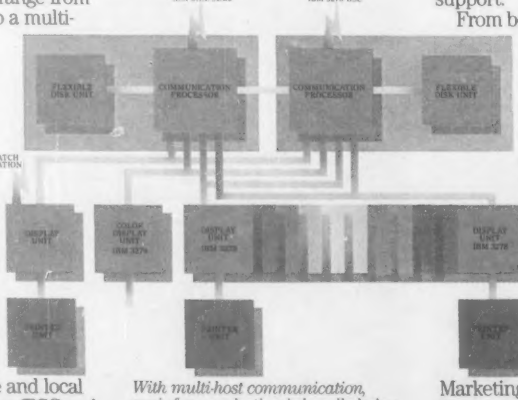
With any configuration, system integration is exceptionally easy. The same set of Alfaskop hardware is both compatible with and can interchange with most host systems. System 41 offers a choice of communications processors for remote and local interface. Synchronous (BSC and SNA/SDLC) and asynchronous protocols are standard. This allows connection to IBM System 360/370/30XX or Series 4300.

That covers your system needs perfectly. But we meet human needs equally well. Extensive use of ergonomics means that Alfaskop adjusts to people and to the working environment.

A prime case in point is the Alfaskop display unit. It's small and easily placed to provide a compact, uncluttered workstation. And it's designed to screen out potential problems.



Alfaskop comes with operating system and emulation software, plus a choice of application programs.



With multi-host communication, mainframe selection is handled via keyboard commands.

For less than optimum lighting conditions, the display unit has an integral hood to shield the screen from harsh, direct light. To be easy on the eyes, we've also incorporated a non-reflecting screen with amber characters on a brown background.

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From both system and human viewpoints, Alfaskop System 41 fits perfectly in the systems you design and integrate. For further details and application specifics, contact: Ericsson Information Systems, The Meadows Office Complex, 301 Route 17 North, Rutherford, NJ 07070. Telephone (201) 939-5300. Or Ericsson Information Systems Marketing Operations, 7465 Lampson Avenue, P.O. Box 938, Garden Grove, CA 92642. Telephone (714) 895-3962.

Performance of Mainframe, 32-Bit Mini Merging

By Delmer Hunter
Special to CW‡

As the performance of 32-bit minicomputers continues to rise, they are taking over many of the applications formerly given to mid-range mainframes. Indeed, their performance, price and architecture make superminis the systems of choice by a wide margin for many applications.

With this level of performance, the major issues today in deciding between a mainframe-style processor and a supermini are architecture, software availability and system compatibility.

'Mainframe IBM-style architecture was built to handle large applications in large chunks, with no interruptions other than those required for system functions . . . Minicomputer architecture, on the other hand, was built for exactly the opposite purpose — to handle interactive applications with nonpredictable real-time interruptions from more than one source.'

The difference in architectures between superminis and mainframes makes the 32-bit supermini far more suitable for today's on-line applications, as well as some of the medium CPU-intensive computing tasks in areas like computer-aided engineering. The differences arise from the type of task each class of computer was designed to handle.

Mainframe IBM-style architecture was built to handle large applications in large chunks, with no interruptions other than those required for system functions. There was one job stream with predictable I/O requirements and a relatively large, undivided memory space.

The architecture's goal, once all the parameters of an application were set up, was to perform that application as quickly as possible. As on-line, multiuser applications grew, system functions were added to the basic architecture for I/O handling, interrupt scheduling and memory partitioning, to name a few. For an on-line system, the user buys a mainframe plus an assortment of front-end gear.

Minicomputer architecture, on the other hand, was built for exactly the opposite purpose — to handle interactive applications with nonpredictable real-time interruptions from more than one source. This interactive history led to architecture that differed from mainframe architecture in three major ways.

The first difference is a larger CPU for the same size task — that is, if all other system elements are comparable, a supermini will possess more raw computing power. This is simply because an engineer must be somewhat like a utility company, supplying power the moment it is requested. This leads to built-in excess capacity and higher relative performance as the system becomes more complex.

Growing Applications

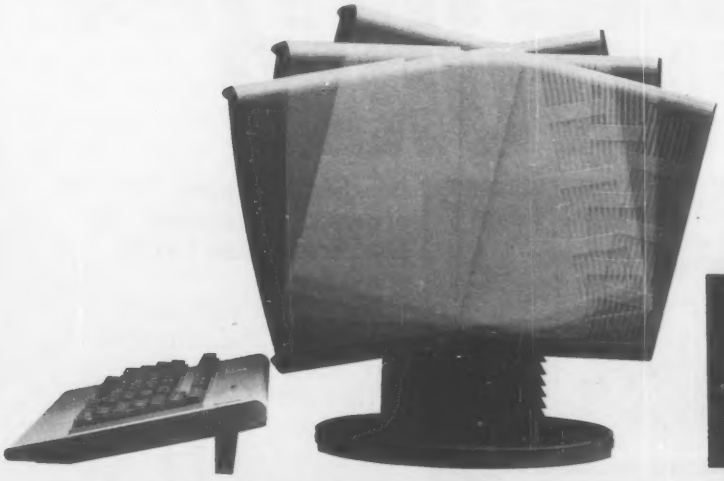
As minicomputer architecture grew into the 32-bit supermini, the size of the applications it could handle and the number of interrupts grew with it. The mainframe architecture devised in the '60s has less excess capacity because it was built for single-stream batch jobs, where demand for computing power is predictable. Sliced up to handle multiple users, it has grown very little in the past decade.

Second, a minicomputer operating system is structured to handle efficiently multiple users. Its scheduling algorithms are optimized for this environment, with efficient handling of multiple memory segments, minimal overhead in switching tasks and the ability to handle multiple tasks within a process and then to handle multiple processes. In contrast with these built-in functions is the com-

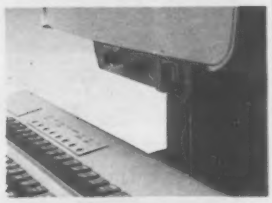
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SYSTEM 41

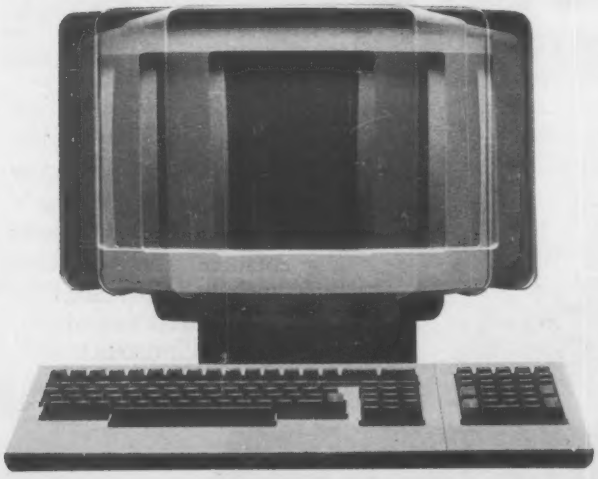
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Minis Taking Over Mainframe Applications

(Continued from SR/9)

plex JCL required in an IBM-style application.

Third, the interrupt structure and I/O handling are built for multiple keyboard users. A mainframe architecture built for quickly reading a large number of records into memory is inefficient "chasing" characters from keyboards and must rely on channel adapters and I/O controllers, with their attendant buffers, to manage terminal devices.

These three areas have a major impact at the system software level where the supermini environment is simpler than the mainframe because less overhead is necessary to support interactive work, and fewer interdependencies exist between components.

This is not to say that supermini instruction sets are not as powerful or comprehensive. What it means is that superminis are far more "tweakable" than mainframes in the large integrated applications now being developed.

Next Best Thing

Because there is no way that a computer manufacturer can predict how many system resources each part of a specific application will take, it does the next best thing, which is to supply a series of tools that allows this tailoring to be quickly and easily done by the person who knows that application best.

A set of utilities and tools are available that permit a user to allocate system resources and set task priorities very specifically at whatever level the user wishes, from simple adjustments such as guaranteeing a certain percentage of CPU cycles to a process to relatively more complex adjustments such as deciding which branch in an instruction stream will flush the instruction pipeline.

Application software, a sticky point with early minis, is no longer an issue: Most major packages have been, or are being, ported onto the supermini.

Some superminis support every major language and provide data base, networking and communications software. These capabilities have encouraged the major software houses to convert their packages onto the supermini. These packages include integrated financial and manufacturing packages, vertical applications and many engineering and design packages.

The conversion problems from mainframe to supermini have been trivial for those packages written in high-level languages — as long as the supermini supports standard versions of the languages.

System compatibility, from desktop to mainframe, is rising in importance as end users, management information systems managers and manufacturers gain experience with the new wave of computing power and understand how on-line systems will evolve.

The first on-line systems had two levels: dumb terminals on the desk and the mainframe at the central site. Today, the dumb terminal is often augmented by a personal computer, which often is not compatible with the mainframe.

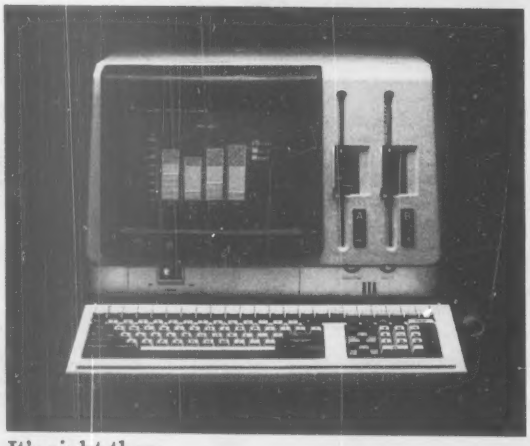
In the future, as on-line information systems expand, the typical system will add a third, intermediate level between the desktop and the mainframe. The question then becomes: At which level does one put the interactivity?

The answer lies in the nature of information use. At the desk, a worker needs three functions:

- Access to public data bases.
- Support of his own activities for work that is not related to the corporate data

(Continued on SR/11)

CAN YOU FIND THE IBM* 3278 HIDDEN IN THIS PICTURE?



It's right there.

Inside the Advanced Personal Computer from NEC Information Systems.

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Get the advantages of personal computing plus direct connect 3278 emulation.

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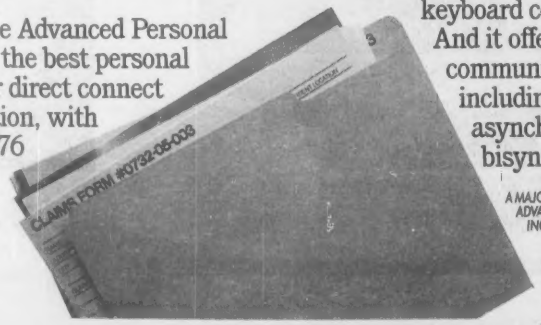
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A MAJOR INSURANCE COMPANY IS USING THE ADVANCED PERSONAL COMPUTER TO GREATLY INCREASE WORKER PRODUCTIVITY.

Supermicros Making It as Multiuser Systems

By David Van Den Berg
Special to CW‡

A few years ago, a manager looking for a multiuser computer system had to consider an expensive minicomputer or an even larger system. At that time, the investment for a system supporting two or more users was substantial.

Today, the options are broader. Top-of-the-line microcomputers offer multiuser, multifunction capabilities that eventually may make the minicomputer market obsolete.

The two types of systems now offer similar performance and capabilities at dissimilar prices. Since the supermicrocomputer is new to the business market, thorough comparative information is hard to find.

This means that today's manager must sort through a bewildering number of arguments concerning system price, price per unit, distributed vs. centralized data bases, system degradation and various fine points of system architecture in order to make his selection.

These arguments are overly complicated and often mask the real considerations. And the real considerations are simple.

A user needs an affordable system that will solve his immediate needs and expand to meet future needs.

The following points will help the potential user understand the differences — advantages and disadvantages — of multiuser micro and minicomputers:

• **Initial acquisition price.** Probably the most important questions you'll need to address are: "How many people will eventually need to share information stored on the same system?"; and "Do you expect your business [and therefore your computing needs] to grow?" Whether you start with one user or several, it's the long-term need that will dictate the system capability and software you should buy.

Next, you need to decide how much capital you want to invest immediately. With

(Continued on SR/12)

Own for less than you pay in rent.
With all this functionality, you'd probably expect to pay a small fortune for the APC. Surprise! The APC can be purchased for less than 1 year's rental charges on a 3278.

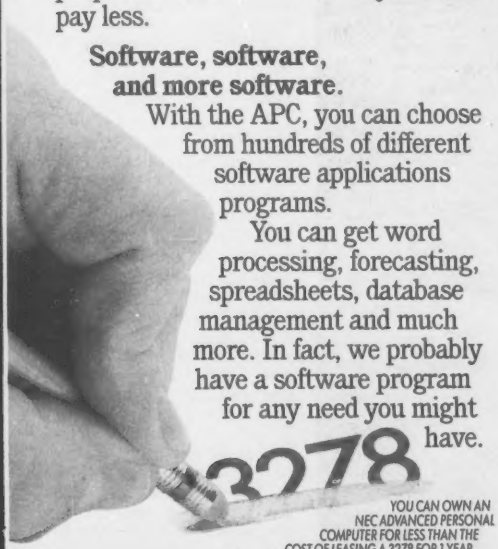
Which means you can offer your people a lot more functionality and *still* pay less.



WITH THE ADVANCED PERSONAL COMPUTER, DESKS ARE LESS CLUTTERED AND PEOPLE ARE MORE PRODUCTIVE.

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Applications Expanding For Minis

(Continued from SR/10)

base.

• Support of his own activities for work that is related to the corporate data base.

The ability to shift a file transparently from desktop to mainframe, and vice versa, is critical in this environment. Today, it is difficult to interface any local intelligence to an IBM 4341, whereas system compatibility and networking software from some vendors make it a simple, transparent task.

At the intermediate level, the upward- and downward-compatible supermini becomes the super traffic manager, interfacing desktop systems with the mainframe system and providing computing power if it is required. This type of integrated application cannot be done efficiently without compatibility from desktop to mainframe.

There are other reasons why superminis are replacing mid-range mainframes in many applications. In the marketing area, mainframe companies generally extract a premium for expanded performance and memory; with the supermini, increased price/performance has generally cost incrementally less.

The supermini's virtual performance makes it more suitable than mid-range mainframes for all but the largest modeling programs.

Hunter is manager of large systems marketing for Data General Corp. in Westboro, Mass.

Choosing Between a Multiuser Micro, Mini

(Continued from SR/11)

a minicomputer system you need to buy a single computer that satisfies your future requirements. As you add users, you can add inexpensive terminals. That means you'll have a large up-front cost; adding users until you reach system capacity is relatively inexpensive.

The initial expense for a supermicrocomputer is much less. Instead of a single large investment, your system is built through a series of smaller purchases.

Therefore, if you eventually need a system to support many users but initially will have only two to four, the start-up cost for a minicomputer system will be very expensive compared with the new supermicrocomputer systems.

The multiuser microcomputer-based systems can be expanded indefinitely by networking or wiring the computers together, providing a broad range of capabilities in the future at a much lower cost compared with the minicomputer system.

● **Price per user.** With a large minicomputer system supporting many users, the initial cost is great, but as users are added, the cost per user can get quite low. The initial cost of the microcomputer system, however, is very low; and the cost of adding users is also quite low, therefore decreasing the price per user.

● **Decentralization helps in a crunch.** A computer failure is a problem no matter what the size of the company. One advantage a networked microcomputer system has over a minicomputer system is redundancy. If a minicomputer goes down, the entire system is rendered useless. In a networked microcomputer system, if one CPU fails, critical office operations can continue by running off the remaining computers.

● **Software.** A common misconception is that the minicomputer can run much more powerful software than the microcomputer. Today's 16-bit supermicros are capable of running software for most critical business applications, including accounting and word processing.

In some cases, the software was used and refined for many years on minicomputers before it was transported to the 16-bit environment. As a result, not only can today's supermicro user get the same powerful software available on the minis, he can be secure in knowing the software is proven.

● **Number of terminals.** Minicomputers have developed a reputation as medium-size to large computers that can support a large number of users. Many minicomputers effectively support very few simultaneous users or terminals.

● **File management and data bases.** Probably the primary reason most companies decide to automate is to store and manipulate the large amounts of data that are generally clogging the filing system. Each computer, whether mini or micro, performs that function. With a minicomputer, all files are stored in the host computer and are accessible to all users hooked to that computer.

It is the same with the microcomputer. However, users have immediate access only to those files in the system to which they are hooked. Files in other computers can be accessed through the network available on that particular computer.

If different elements of your organization maintain their own data bases, while only occasionally, if ever, referencing other data bases, then chances are good that the supermicro is all the system you will need.

Van Den Berg is vice-president of marketing for Fortune Systems Corp.

PROGRAM MAINTENANCE.

IT'S AN IDEA WHOSE TIME HAS GONE.

Most application programmers should really be called maintenance personnel: 60 to 80 percent of their time is consumed making "quick" patches. While the applications development backlog steadily mounts.

Fortunately, users of Microdata computer systems have a way to break the logjam: ALL. The Application Language Liberator.

ALL users define their applications on a series of menu-driven input screens. While ALL automatically builds the application from a comprehensive set of debugged, machine language building blocks.

ALL handles labeling, format definition and documentation according to predefined standards. So update and maintenance time is slashed dramatically. (Even when the original programmer has moved on.)

ALL cuts new application development that once took months down to a few days work. Major applications involving complex file structures, multi-level input screens, multiple report formats, menus, utilities, detailed math and logic functions, and security access provisions can be developed easily using the ALL system.

Imagine! Less maintenance. Automatic documentation. Faster development. Bye-bye backlog.

For more information on an idea whose time has come, write Microdata Corporation, P.O. Box 19501, Dept T-208, Irvine, CA 92713.



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How do you get a great software idea off the ground?

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Now every software developer can build applications that are fully portable from microcomputer to microcomputer... from 8-bit to 16-bit and even to 32-bit environments ...from microcomputer to mini or mainframe... and for every popular operating system available today.

With Digital Research languages, you can design your applications once and be guaranteed that they'll work across different processors and operating systems. This important advance in programming productivity is available because now Digital Research offers the most important commercial programming languages in sophisticated compiler implementations that are inherently portable.

Just select the Digital Research language that's best for your application: CBASIC Compiler,™ Pascal/MT+,™ CIS COBOL,™ Level II COBOL,™ PL/I, or C. You'll find the dialect, high performance, development features and flawless execution you need to achieve outstanding performance in your applications package.

Working with Digital Research languages, you know that your software will get off the ground faster... and cover more ground in the computer world.

After all, who knows more about the value of portability than Digital Research, the creators of CP/M®?

Ground-breaking innovations in productivity.

Programmers need more than just a language. That's why Digital Research made all of our languages compatible with our complete workshop of professional quality software development tools. Our Display Manager™ and Access Manager™ packages simplify the design of screen display and



ages from Digital Research.

file access routines, a tremendous savings in time and effort.

And our SpeedProgramming Package™ for Pascal/MT+, ANIMATOR,™ source level debugger, and other productivity tools for COBOL, are invaluable in bringing your software up and running in record time.

Top Quality Technical Support Keeps You on Solid Ground.

Digital Research gives you the expert, responsive technical support you need…when you need it. Our language documentation is excellent—it provides you with full reference guides and how-to information. Plus, the DRI Hot Line puts you directly in touch with a large technical staff of superbly-trained people, 100% dedicated to resolving your problems and guiding you in your debugging efforts.

And to help you get the most from our languages, Digital Research issues extensive application notes at regular intervals and an ongoing series of training seminars.

Independent Software Vendors who develop software on our languages get the industry's strongest program of marketing assistance, and other benefits of Digital Research's long-standing commitment to ISV support.

When you depend on Digital Research languages and productivity tools, you're on very solid ground.

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COMPUTER CORPORATION

Digital Research

CBASIC Compiler

The best for sophisticated business applications.

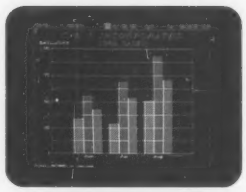
CBASIC is the industry-standard commercial dialect of the popular BASIC language. The original implementation of CBASIC as a pseudo-code interpreter conserves random access memory, allowing more memory for application programs. CBASIC Compiler is a direct enhancement of CBASIC that runs 5 to 10 times faster in execution than most BASIC Products.

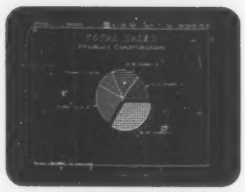
Implemented as a native code compiler, CBASIC Compiler allows you to write, test and finally, combine separate modules to create completed programs. Multiple line functions can be externally defined and have local variables, much like the procedural, block-structured compilers of Pascal and PL/I. This efficient, modular, top-down approach makes CBASIC Compiler programming significantly faster to write and easier to maintain. You are also given maximum flexibility to define your own extensions to the language.

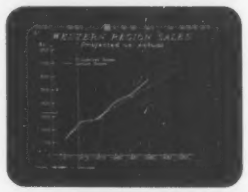
CBASIC Compiler includes a fully-integrated set of graphics statements and functions. They provide a powerful, device-independent graphics capability, including figure drawing, a graphics character set, multiple line styles, flexible viewing area control and graphic input.

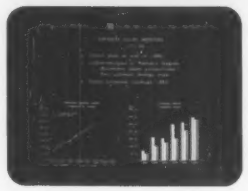
When you consider all its capabilities, CBASIC Compiler is the best language choice for programming in a sophisticated business environment:

- Native code compilation
- Multiple line functions externally defined with local variables
- Powerful graphic statements and functions
- 14 decimal digit accuracy
- Comprehensive 32K byte string processing
- Expanded file processing techniques
- Support of multi-user operating systems
- Compatible with Display Manager and Access Manager
- Compatible with CP/M Graphics™









Pascal/MT+

Best for work where programming speed and accuracy count.

Pascal is a highly-structured language originally designed for teaching programming. Data types are extensive and matched to your programming needs. These qualities, plus compactness and execution speed, have made Pascal highly regarded as a microcomputer development language.

Digital Research's Pascal/MT+ is a direct-compiling dialect of the full ISO standard Pascal—greatly enhanced and extended to maximize the inherent versatility and portability of Pascal. The Pascal/MT+ native code compiler executes much faster than traditional p-code Pascal compilers.

Pascal/MT+ supports floating point real numbers for scientific applications and decimal numbers for arithmetic precision in business applications. ROM-able code can be generated for industrial applications. And in educational environments, Pascal/MT+ is easily-learned and never outgrown.



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- 8087 nume

Level I

The best for development

COBOL (Oriented La

h has the best

Pascal/MT+ is the best software development tool available today. The Pascal/MT+ programming system includes a compiler, a linker, a run-time support library, a disassembler, and a symbolic program debugger. And Digital Research has developed a unique SpeedProgramming Package that locates syntax errors, a major timesaver in program development.

There is no better Pascal for program development:

- Superset of ISO standard Pascal
- Separate modular compilation
- Efficient native code
- ROM-able machine code
- Complete development tools
- Enhanced arithmetic functions
- Extended data types
- Powerful overlay capabilities
- Compatible with Display Manager and Access Manager
- Compatible with CP/M Graphics
- 8087 numeric processor support

Level II COBOL

The best for mainframe-level development.

COBOL (COmmon Business Oriented Language) is the most widely-used language for mainframe computers. Today, the total investment in COBOL programming in the U.S. exceeds 100 billion dollars, greater than the Gross National Product of Switzerland.

Level II COBOL gives you the full facilities of mainframe COBOL on your 8-bit or 16-bit microcomputer, allowing you to develop mainframe programming with the interactive facilities of a microcomputer. Level II COBOL is the ideal choice for developing applications in a corporate environment where COBOL software and expertise are already present.

Level II COBOL is a mainframe-level compiler for ANSI 1974 COBOL meeting the highest possible standards: certified by the General Services Administration to "High with Zero Errors."

Digital Research also supplies software development tools to make Level II COBOL highly attractive as a development environment. Native Code Generators allow faster program execution than intermediate code, by providing translation of the finalized program into highly-optimized native code that executes 5 to 10 times faster. The ANIMATOR logic display system allows the programmer to interactively observe and debug the logical path of program execution at the level of source code statements.

Considering the advantages of portability of software between mainframe and microcomputers, Level II COBOL is the obvious choice for large corporate environments:

- Inbuilt sort-merge capability
- Segmentation
- Inter-program communication
- Multi-key indexed sequential file handling
- Run-time specification of external file names and program names
- Use of dynamic paging to allow implementation of programs greater than 64K on 8-bit microcomputers
- Powerful interactive screen handling



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CIS COBOL

The most popular COBOL for microcomputers.

CIS COBOL is the complete system for compiling, testing, debugging, and executing standard COBOL programs. It's called CIS COBOL because it is Compact, Interactive and Standard . . . and has become the most widely favored version of the popular ANSI 1974 COBOL language.

With CIS COBOL, you can run existing mainframe and minicomputer programs on your microcomputer. Or you can use a microcomputer to develop COBOL software for larger systems. Or you can create COBOL software to use on your microcomputers to take advantage of COBOL's powerful data processing functions:

- ANSI 1974 standard
- Compact intermediate code for running large programs
- Powerful interactive screen handling
- Dynamic loading of segments and called programs
- Support for all major COBOL file processing systems

Display Manager

The best way to achieve portability for your screen displays.

When you use Digital Research languages, there is no need to waste valuable development time formatting information for screen displays. Display Manager does it for you.

Display Manager pro
you with a full-screen ed
works as a stand-alone
to help you design imag
will run on any CRT te
part of your applicatio
programs.

Literal data as well a
and output fields may
anywhere on the screen
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available on modern te
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line and half-intensity,
now . . . color!

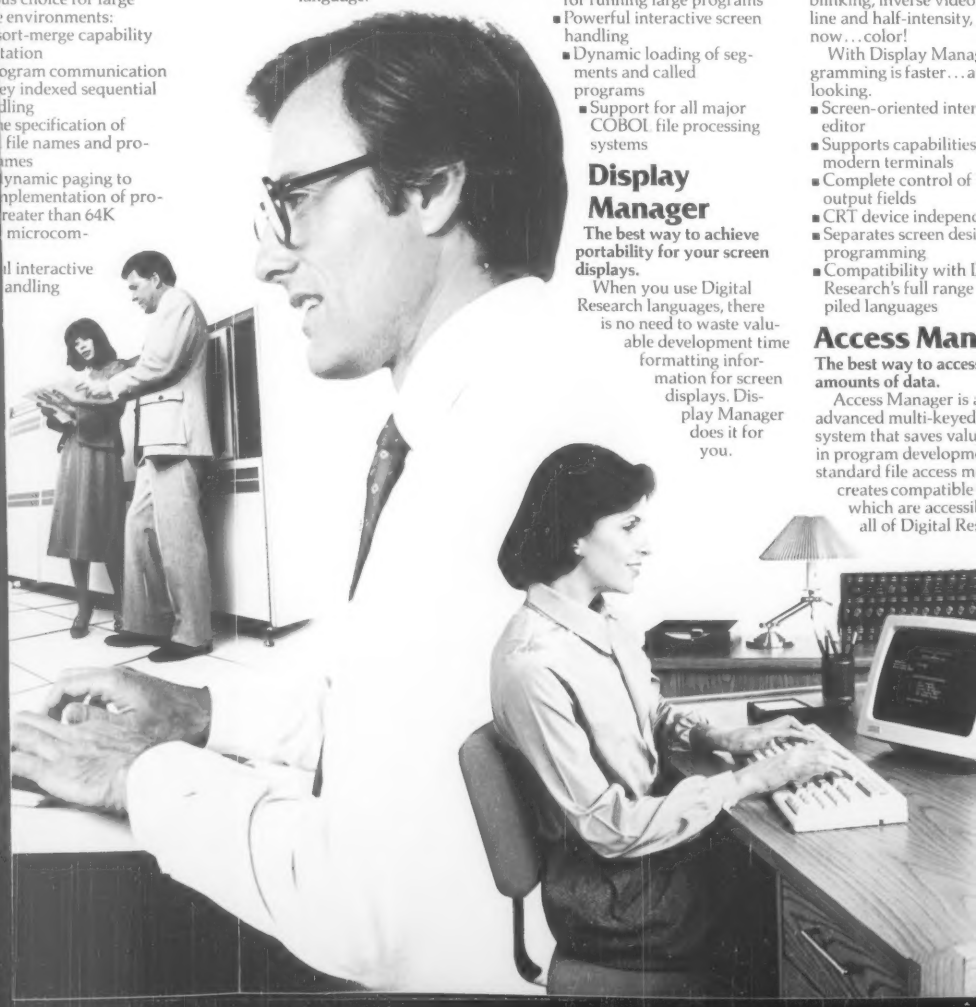
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- Screen-oriented inter
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- Supports capabilities
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- Complete control of
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- CRT device independ
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Access Man

**The best way to acces
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Access Manager is a
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compiled languages. This flexibility becomes significant when using Access Manager in multi-user environments, where the system's file and record locking features are essential.

Access Manager is fast, versatile and intelligently organized for efficiency. Separate index and data files are maintained, eliminating the need to sort data files or reorganize indices when adding or deleting records. And the index can be read in any direction for faster access to data.

The result is a file access system that provides fast, efficient access, efficient use of disk space, and no overhead in file maintenance . . . with an important bonus of compatibility with a wide variety of languages. Access Manager provides invaluable savings in both program development time and program execution time:

- Multiple keys
- Automatic support for duplicate keys
- Indexed access to data records
- B-tree index structure
- Multi-user support with record and file locking
- Efficient memory utilization
- Compatible with all Digital Research compiled languages

PL/I

A high-performance professional programming language.

PL/I is a powerful, easy-to-learn, all-purpose language that rivals both FORTRAN for scientific applications and COBOL for commercial applications. This makes PL/I the best language to meet all the needs of a professional programmer.

Digital Research has created the first implementation of PL/I for microcomputers.

Based on the widely-used ANSI Standard Subset G, Digital Research PL/I programs are easily ported from micro to mini to mainframe. And, by following a few simple rules, your programs are also portable from mainframe to mini to micro!

The Digital Research PL/I program development system includes an optimizing native code compiler, a relocatable assembler, a relocating linker, a library manager, a cross-reference generator and a comprehensive library of useful built-in functions. Together, these tools provide a fast, integrated system for developing your own scientific, commercial and system software.

Best of all, the programs you create with PL/I are extremely efficient. That's the result of the state-of-the-art optimization and decades of compiler experience behind Digital Research's PL/I. It's no wonder that only Digital Research can offer you PL/I for microcomputers.

- Structured control statements
- Fixed binary integers
- Single and double precision floating point
- 15 digit arithmetic
- Bit string operations
- Character string operations
- Full control of compiler storage allocation
- User controlled error handling
- Supports Display Manager and Access Manager
- Supports CP/M Graphics

DIGITAL RESEARCH™

C

The best language for systems implementation.

C is an advanced, elegant programming language built for coding power and execution speed with a minimum of constraints. C gives skilled software developers the ability to take full advantage of the inherent structure of the computer, including large model support on the 8086. C is ideal for performance-critical applications and systems-level programming.

The Digital Research C programming development system includes a feature-packed compiler, linker, and a comprehensive run-time library which contains a wide range of utilities. Digital Research C is a complete implementation of the C language, fully compatible with the UNIX™ standard C language. Built into the compiler is a sophisticated error-checking facility which contains many of the features of the UNIX program, LINT. The run-time support library handles everything from transcendental functions to input-output. Altogether, Digital Research C is an integrated answer to all your programming needs.

C is not for everyone. But for the experienced software developer, it is one of the most powerful programming tools available.

- Full C language implementation compatible with UNIX Version 7
- Single and double-precision floating point
- 8087 numeric processor support
- Enhanced programming/debugging tools
- Comprehensive utility package included
  - Multiple 8086 memory model support





Our portability gives your software the best of all worlds.

	8080/8085/Z80 CP/M MP/M II	8086/8088/80186 CP/M-86 Concurrent CP/M-86 MP/M-86	8086/8088 IBM PC DOS	MC-68000 CP/M-68K
CBASIC Compiler	*	*	*	*
Pascal/MT+	*	*	*	*
C		*	*	*
PL/I	*	*	*	TBA
Display Manager	*	*	*	TBA
Access Manager	*	*	*	TBA
CIS COBOL	*	*		*
Level II COBOL	*	*	*	*
COBOL ANIMATOR	*	*	*	*
Level II COBOL Native Code Generator		*	*	*

And the best is yet to come.

Digital Research's ongoing development efforts in languages, graphics, and productivity tools express our continuing commitment to supporting important new systems and operating environments as they emerge.

That's your guarantee that your investment in software development will continue to return a maximum of utility and longevity, even as the microcomputer industry continues to grow and change at rapid speed.

The design quality, technological foresight and business integrity of Digital Research is reflected in the portability and upward-compatibility of our software products.

No other company in the world offers the scope and depth of microcomputer systems software that Digital Research does today.

But that's only the beginning. The microcomputer industry has a long way to go. And Digital Research is committed to lead the way by offering the best of everything for professional software development.

Get more background.

For more detailed technical information about Digital Research's languages, productivity tools, and graphics products — and the location of your local CP/M Library™ dealer — call (800) 227-1617, Ext. 400. In California call (800) 772-3545, Ext. 400.

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The best of everything in professional software.

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To Fight Back Micro Invasion

Mini Vendors Must Grasp Market Realities

By Elliot Friedman
Special to CW‡

Things are looking pretty grim for minicomputer vendors in their traditional business.

Beginning in the late '70s, a combination of economic, technical and market factors conspired to halt the booming growth of the minicomputer industry. An economic downturn of major proportions was under way. Large-scale integration/very large-scale integration was evolving from a component in big computers to a full-fledged computer on one board.

This technological advancement was used to penetrate rapidly the minicomputer market by microcomputers from the low end and by compact mainframes, such as IBM's 4300 series, from the high end.

Mini vendors did not react to the changing world quickly enough. Abysmal management during the boom years (characterized by unfocused research and development, overnight reorganizations, inconsistent marketing and sloppy administration) had created organizational giants that were clumsy and slow to react. In short, minicomputer vendors missed the microcomputer boat.

Mini makers failed to recognize the new market that was emerging from within their traditional market. They failed to address the needs of the professional end user — needs that have become a litany for the success of the microcomputer industry:

- It costs less to start building a network of microcomputers, and the size of the network can be changed incrementally.
- Users control their own data and who has access to it on a microcomputer.
- Micro software is easier to use and there is more of it; there are thousands of companies developing software for microcomputers.
- A decentralized network of micros is not vulnerable to a shutdown when the central processor on one micro crashes. Response time is consistent, and there is no queuing time on a micro.
- A battalion of microcomputers costs no more on a per workstation basis than a mini with an equal number of terminals.
- The emergence of communications software for microcomputers allows networking, previously possible only on minis and mainframes.

Despite the phenomenal success of micros, it's a little premature to call your broker and short minicomputer stocks. The microcomputer penetration has made computer literacy a national imperative. That and the economic upturn mean a broader market, with some solid opportunities for minicomputer vendors.

Capitalize on Advantages

Minicomputer vendors are in an excellent position to capitalize on technological advances by exploiting their own advantages, especially in relation to the growing corporate market. The professional computing installation has hundreds of desktop computers that require high-quality support, training and communications capabilities. Minicomputer vendors are prepared to meet the demands of that market now.

The big minicomputer vendors, such as Digital Equipment Corp., already have extensive marketing and support organizations in place that no micro vendor can match. They are better vertically integrated and have the economic power and experience to compete successfully in all phases of the small computer hardware and software business, including research and development, engineering, manufacturing, distribution and support.

The newer micro organizations have grown up specializing in only one or two of these areas.

Minicomputer vendors started the easy-to-use, interactive software revolution. Operating systems developed by DEC in the '70s were the predecessors of Digital Research, Inc.'s CP/M and Microsoft, Inc.'s MS-DOS.

Minicomputer vendors are accustomed to linking together networks of individual computer users sharing data and computing resources. They invented the concepts of distributed computing and distributed data bases and are ahead of the micro hoards in local-area networking.

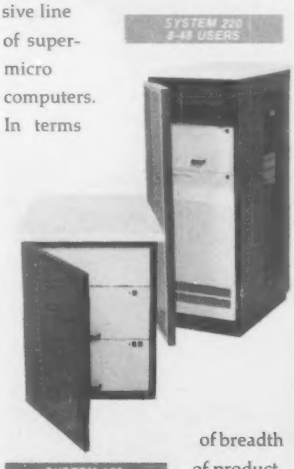
Makers of minicomputers have been better at maintaining compatibility across a range of machine sizes than makers of larger and smaller systems, which means a smooth growth path for users. They have long-standing close ties to the academic laboratories, where advances

(Continued on SR/22)

Performance runs in our family.



At WICAT, our primary objective is performance. This attitude has created today's most comprehensive line of supermicro computers. In terms of breadth of product, software support, and perhaps most importantly, reliability, WICAT is a performance company.



WICAT has created a family of supermicro computers versatile enough to meet virtually any computing requirement. Our systems support from 1 to 48 users, 256K to 14 MB of main memory and from 10 MB to 474 MB of disk storage. So from the fast single user desk top S-150 to the powerful rack mounted S-220,

WICAT provides the strength, speed, and flexibility to perform according to your company's unique requirements.

In the course of just two years, we have been successful in providing WICAT's customers with two operating systems (MCS and UNIX), 9 programming languages, as well as word processing, data base management systems, a virtual electronic spreadsheet, and the WISE authoring system. This is performance. Our software designers have concentrated on producing tools which formerly existed only in the mainframe or minicomputer environment.



This performance story began with the introduction of the first 68000 based microcomputer and now includes the installation and support of thousands of systems worldwide. Consider this a personal invitation to call us and get more information about the WICAT family.

WICATsystems

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Where to Turn When Mini-Micro Mania Strikes

By Sandra J. Kay
Special to CW‡

The recent proliferation of minicomputer and microcomputer systems aimed at the small business market has created confusion among inexperienced people responsible for selecting a system from among the many vendor offerings.

When microcomputers arrived on the scene 10 years ago, professionals spent a great deal of time defining the differences between microcomputers, minicomputers, mainframe computers and distributed processing systems. Those definitions have been modified over the years and will probably continue to be modified as vendors give new descriptions to their products.

For the purposes of this discussion, let's say that both microcomputers and minicomputers use microchip technology, but that microcomputers are capable of performing one task at a time, while the minicomputer performs multiple tasks simultaneously.

The decision of where and when to use computer equipment depends on the complexity of the task and the number of items to be processed. This type of logic applies to all automated equipment. Practical management theory blended with general data processing knowledge provides the best method of matching computer equipment and computer software with the tasks to be performed.

Also, one needs to keep in mind that practical management theory advocates setting practical dollar limits on converting to any kind of equipment; computer equipment should be regarded in the same manner. To accomplish complex tasks successfully, higher limits of resources can be justified. Simple tasks or tasks specifically suited to a single-function system require fewer resources.

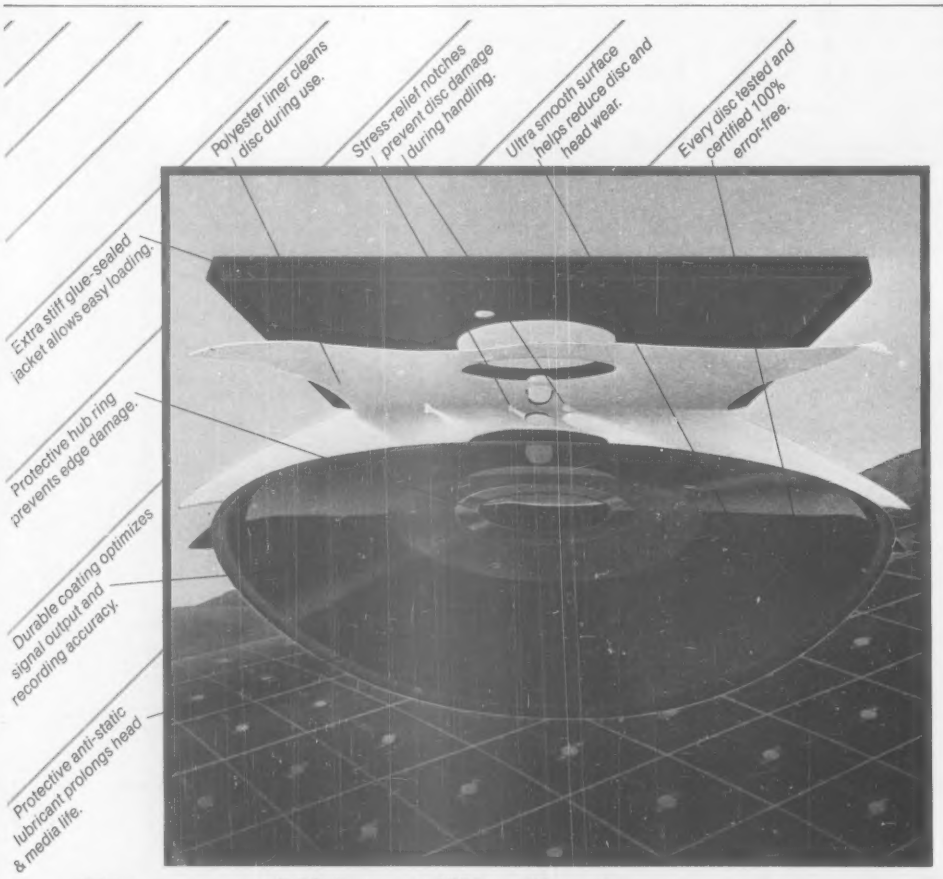
As mentioned above, microcomputer equipment and technology have been on the scene for at least 10 years. The delay in delivering micros to small business and the consumer has been in the refining of the manufacturing process and the writing of computer software.

Minicomputer manufacturers have integrated the micro technology and, with their existing customer base, have been able to offer a continuous flow of software products. But while minicomputer makers have had a jump on the small business market, they are finding their dominance difficult to maintain.

With the proliferation of inexpensive microcomputers, there has also been a proliferation of microcomputer "experts." These people, with varied backgrounds, have turned out volumes of software and are essentially responsible for the success of microcomputers today. With this success comes dollar rewards and more people claiming "expert knowledge."

Fortunately or unfortunately, almost anyone who is determined to solve an isolated problem using a mi-

(Continued on SR/24)



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Mini Vendors Must Face Market Realities

(Continued from SR/21)

in artificial intelligence, decision support applications and voice and video computing are emerging. Mini firms are as well positioned as anyone to exploit the commercialization of these applications.

As micros enter the power ranges previously occupied by minis, software will become more sophisticated, integrated and comprehensive. Minicomputer makers already have powerful software along with old hardware that is relatively easy to replace with the latest technology. They also have experience in marketing, distribution and support.

Because of their experience with OEMs, minicomputer vendors are well positioned to provide supportive and sophisticated development environments for organizations writing software for the new micros. Even now, Pro Computing and Visicorp are using DEC's VAX-11 to develop integrated software packages, and Software Arts, Inc. is using Prime, Inc. minicomputers.

Accepting these facts as true, success for minicomputer vendors means exploiting their experience in software development and in distributed computing vis-a-vis the corporate market and the next generation of computers. It means shifting gears from selling a product to selling their capabilities to make, sell and support a product.

Minicomputer vendors can lead the pack again if they can get their management act together and deal with market realities.

Friedman is president of Pro Computing, which is based in New York City.

Supermini Shipments Rising 31.9% Annually, Report Says

WELLESLEY, Mass. — Shipments of superminicomputers will reach $4.8 billion in 1986, according to "The Superminicomputer Industry 1981-1986: Strategic Analysis," a study from Venture Development Corp. (VDC). Worldwide shipments will grow at a compound annual rate of 31.9% from $1.2 billion in 1981, achieving one of the fastest growth rates of any product in the computer industry.

Because the term "superminicomputer" has been used to describe a great variety of computer systems, its usage is sometimes vague, VDC said. The report defines a superminicomputer as a CPU with an internal word length of 24, 32 or 48 bits; 1M byte or more of logical address space, maximum main memory capacity and maximum program size; and the use of a bus structure rather than the point-to-point structure typical of mainframes.

The new machines offer increased computing power, lower operating system overhead, cost-effectiveness and the ability to handle real-time and time-sharing applications.

Essentially, 32-bit superminicomputers are redefining the word "minicomputer." As a result, there will be a much greater range of power available in a 32-bit superminicomputer by 1986, VDC predicted.

Superminicomputers are not a new technology. They are extensions of existing technologies. The system architecture, transitor-to-transitor logic circuits, memory chips and devices are all common technologies available to and used by minicomputers and other computer systems. Register sets and 32-bit-wide data paths draw upon the device characteristics, not upon any inherent underlying technology, the report stated.

Essence of Supermini

The essence of a superminicomputer is the 32-bit I/O bus structure that interconnects the subsystems of the computer. Harris Corp. superminicomputers are the only ones to use a 24-bit-wide or 48-bit-wide data bus, according to VDC.

The use of a 32-bit word not only allows twice as much data to be moved in the same period of time as a 16-bit pathway, but also can allow instantaneous access to a much larger data space.

The ability to address huge portions of memory leads to the second main attribute of a superminicomputer: the register length used in formulating the memory address must be 32 bits in length. The use of 32 bits allows the computer to address directly up to 2^{32} or 4,294,967,296 memory locations vs. the typical 2^{16} or 65,536 locations that a standard 16-bit minicomputer allows, the report said.

"This huge address space is of tremendous value to both the systems designer and the end user. For the systems designer, memory protection and virtual memory schemes are much easier to implement with a 32-bit address space. Multitasking systems are also easier to implement. To the end user, 32 bits mean faster computation and easy handling of large numbers with great accuracy," VDC said.

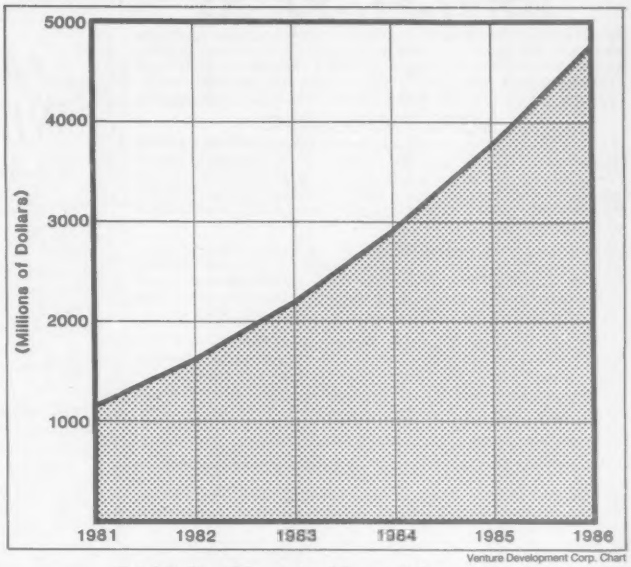
The logical address space is much larger than with a 16-bit machine; VDC's definition specifies the logical address space to be 1M byte or greater. Such a huge address space allows the maximum program size to be very large — 1M byte or more. The maximum program size can be equal to or less than the logical address space.

Large program sizes combined with high throughput and 32-bit-wide data paths are ideal for computation-intensive applications such as computer-aided design and manufacturing, simulation and laboratory analysis, as well as real-time data acquisition programs, according to VDC.

The most important trend in the minicomputer industry, the study said, has been the extension of vendors' product lines to include a 32-bit superminicomputer. IBM mainframes have used 32-bit structures for many years; now minicomputers have the potential to compete against mainframes. In fact, IBM plug-compatible manufacturers have used minicomputer architecture and 32-bit data paths to create high-performance computer systems.

The superminicomputer is often an extension of the vendor's 16-bit minicomputer line, sometimes using a superset of the instruction set. Using 16-bit software on a superminicomputer is difficult, however, due to differences in instruction format, lengths of subroutine return address on a stack and other factors, accord-

(Continued on SR/25)



Venture Development Corp. Chart

Total Dollar Shipments of Superminicomputers

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Micros and Minis Will Coexist When Markets, Uses Are Defined

By Frank R. Jacobson
Special to CW‡

Today's minicomputers have many strengths that cannot be rivaled by microcomputers. Capabilities such as host computers, front-end systems, shared memory systems, clustering, message switching and networking all indicate the advantages of the minicomputer over the microcomputer in many application areas.

Existing manufacturers' operating systems, application programs and universal operating systems, such as Unix, all define markets and applications more suited to a minicomputer than a microcomputer.

The threat of microcomputers entering into the minicomputer markets is real. However, for many reasons, the micro and the mini will survive and coexist. Minicomputer manufacturers have become entrenched in the markets they currently serve to the extent that machines are designed around certain applications.

For microcomputer manufacturers to seek out these applications and become experts will require some period of time.

An even more important element is that the minicomputer market has gone through several levels of "the survival of the fittest." The microcomputer industry is still trying to be all things to all people. This is why micro manufacturers will continue to fall by the wayside. When micro manufacturers find their niche, that is when minis and micros will finally coexist.

The defined marketplaces of both the micro and the mini are going to be fortified even more with the advent of universal operating systems such as Unix. The speed, capability, application and performance of an operating system such as Unix running on a mini cannot be matched by a microcomputer.

Software is the current strength of the minicomputer. The existing operating systems and the vast variety of application programs developed under minicomputer operating systems make entry into this marketplace very difficult.

Minicomputer manufacturers find that their customers may invest hundreds of man-years in developing application software to run on their systems. Because of this commitment by their customers, the manufacturers are forced to provide a path of migration from older models to their new, enhanced models.

The microcomputer manufacturer, in order to penetrate this market, must do an emulation of the operating system in order to salvage the application programs of the customer. This can be very costly to the microcomputer manufacturer, because even when the emu-

(Continued on SR/26)

Resources Determine Equipment

(Continued from SR/22)

crocomputer can produce a software program. However, the software program is only as good as the individual who wrote it. Therefore, microcomputer software can be either good or bad.

In the case of software for minicomputers, established vendors usually have software quality-control procedures that assure a certain amount of operational good.

Users can best decide what type of machine to purchase by:

- Looking at the tasks that need to be done. Are the tasks complex or simple?
- Looking at the amount of resources (dollars and people, for example), that they are willing to spend to automate the tasks in question.

Be sure to include the resource savings in manpower and problem resolution. Also, be certain to include additional resource costs required for using computers (such as purchase/lease, maintenance, software, space/environment, personnel, training and supplies).

What kind of help is available? Every salesman or self-made "expert" who has any indication of a possible sale of new equipment or of an upgrade to existing systems will be at your doorstep. While you can gain a lot of knowledge by talking to many of these people, don't side with any vendor, salesman or self-made "expert" early in your initial analysis.

Also, remember that most of these people are looking for personal gain over and above the best fit for your particular situation. In some cases, the people have limited experience and knowledge of the computer field and know nothing about your business.

If you can locate someone who has been making management decisions or analysis about computerized processes for 10 or more years, use that experienced knowledge for general counseling. A person with general knowledge does not need to know every detail about any particular piece of equipment or software, but he can give you general ideas, keep your decision process on track and make you aware of additional areas that need to be considered.

For complex processes, you may also want to contact a reputable person or firm to provide a systems analysis. Most of all, unless you immediately know that your needs are simple or that you are only willing to spend a small amount of money, delegate the decision process as a project to a logical, capable subordinate in your organization.

By doing this, you are more likely to manage the project assignment as you would any other project and will be better able to keep your people from getting caught in a net of buzzwords.

If managers properly consider the needs of their business, they should find the competition healthy with room for all kinds of equipment to meet a variety of needs.

Unfortunately, computers are marketed as a "solution to all the world's problems," with microcomputers costing less than minicomputers. Thus, a few managers who purchase solely for low cost will probably either decide that computers are too frustrating or admit that too little effort was put into an initial analysis.

Fortunately, the low cost of microcomputers will keep anyone from being hurt too seriously in the pocketbook and may automate some simple tasks for a lot of people.

Kay is president of Sandra Kay & Associates, Ltd.

Misconceptions Abound Among Users

Desktop Unit Purchases Need Careful Attention

By Mike Dawson
Special to CW‡

With more and more microcomputers being placed on the desktops of executives and mid-level managers, non-DP personnel are now an integral part of the decision-making process.

As is often the case, these people are proven in business and finance, but unsophisticated in computer technology. Their lack of understanding of some subtle points of computer management can hinder their contribution to the analysis phase of the project.

Corporate users who know exactly what they want from their future desktop units may be filled with misconceptions about computers in general and microcomputers in particular. These delusions often go unspoken until after the units have been installed, making it the DP executive's responsibility to give voice to them early in the planning stage.

Microcomputer misconceptions basically fall into five categories:

• **A microcomputer is a small unit and therefore a simpler buying decision.** A micro is not a typewriter. It is a computer and is therefore subject to the same rigorous planning and analysis as any mainframe prior to purchase.

• **Micros are cheap and therefore disposable.** Don't be swayed by the Sunday newspaper ads offering microcomputers for $999.99. Expect to spend around $5,000, not including maintenance, for a unit that will serve a business environment. Most companies are buying micros for all executive and staff offices. That can easily generate a minimum order of 20 units, usually much more. That $100,000 represents a sizable enough capital investment that one would be foolish to think of it as a "throw-away" commodity.

• **I can play "what-if" games using my existing corporate data base.** Electronic spreadsheets are extremely useful tools for management. However, these matrices can be large, and if the executive thinks that data is going to get into the matrix electronically rather than through manual keying, he has to take into account two considerations.

The first consideration is the availability of a communications interface that will enable a particular micro to communicate with the existing mainframe under the particular communications protocol already in use. Will modifications have to be made to the existing mainframe's data communications handler?

The second consideration is whether or not there is summary data already available from the mainframe. Usually, those summaries on the last page of reports are calculated while the report is generated. They are printed and then thrown away. They are not kept in the computer. If a programmer has to be called upon to calculate and store that summary data and convert it for transmission to a format the micro can use, this represents a major project to support the micro-based network. Don't forget that most DP shops already have a heavy backlog.

• **I can have access to a computer resource without being at the mercy of DP.** There are thousands of packaged programs that can serve the executive well, but they are limiting in two ways.

They are written for the mass market so they may have features that are not needed and, worse, they may not have features that are needed. Sometimes these programs are sold to companies without the developer's name on them, making modifications impossible. But if a program can be modified or new programs can be written, plan on leaving those efforts to the DP shop.

The user who thinks he can wade through a Basic manual, do some exercises and get into the writing/testing/debugging business is kidding himself and his company. You are better off leaving this to the professionals.

Also, don't expect the same computing power from a general ledger package that costs $350 as you would from a package that came with the $75,000 general ledger system purchased for the mainframe last year.

• **Security.** Over the years, we have learned to put expensive locks and bullet-proof glass on our computer rooms and to establish elaborate security procedures. We have learned to do this the hard way.

If a micro is located in an office that is accessible to the public, its diskettes will occasionally be allowed to lie around on a desktop. What will prevent an outsider who is cooling his heels before an appointment from walking out with a small diskette that contains your customer list or payables information? Any microprocessing decision made without a detailed discussion of security procedures for that decision could result in corporate disaster.

The key to a successful microcomputing network is doing the normal analysis and planning while making sure all contributing members are constantly aware of the importance of the total package price, the actual programming needed for implementation and development and security.

Dawson is vice-president of Flagstaff Software and Business Services, Inc., Flagstaff, Ariz.

Supermini Mart Expanding Fast, Study Reports

(Continued from SR/23)

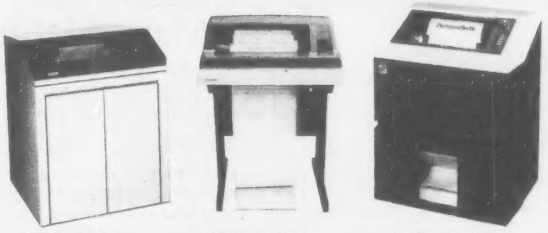
ing to VDC. To overcome this, mode bits and other gimmicks are used to allow 16-bit software to run on the superminicomputer.

The purchase price of a supermini is normally between $40,000 and $300,000 for a complete system. As time progresses, the average price paid for a superminicomputer will fall, although the range may stay the same, the report predicted.

The definition of a superminicomputer has changed over the past five or six years. In the mid-'70s, superminicomputers were defined as Digital Equipment Corp. PDP-11/70s and Hewlett-Packard Co. HP 3000s. Today, VDC's superminicomputer definition excludes these machines because they are not 32-bit machines.

The report costs $2,490 from VDC, 1 Washington St., Wellesley, Mass. 02181.

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Execs See Micro Option as Fast Data Approach

By Anthony J. Paoni
Special to CW‡

Vince Sanchez, vice-president and general manager at First Chicago Corp., described typical executive management decision making as follows: "It's like the mating of elephants. It takes place at a very high level, there is much thunder and noise . . . and it takes two years before any results are evident."

Not so in the fast-paced world of microcomputers. It didn't take United Technologies Communication Co. Chairman Harold Gray two years to decide that the IBM Personal Computer and Context Management Systems, Inc.'s MBA software were right for United Technologies. As a result, 1,100 executives will attend a 2½-day training session and return to their offices where an IBM Personal Computer with MBA software will be waiting for them.

This scenario is being repeated in executive suites throughout the country. Top management is being educated to see quickly the potential of today's microcomputers.

This situation spells trouble for minicomputer suppliers that have successfully established a market niche and are positioned to leverage their organizations in the arriving bullish economy.

As so often happens, the management ranks of most corporations are in need of computer literacy and are finding the microcomputer to be a simple, easy-to-use delivery system for that knowledge. This is not to say that the microcomputer is the best or worst system on which to learn the basics of computer technology, only that it is the most popular.

From the "Machine of the Year" coverage by *Time* [Jan. 3, 1983] through the "Computer Shock" edition of *Business Week* [Aug. 8, 1983], the media continues to use the microcomputer as a lightning rod for attention. The continual barrage of advertisements in *The Wall Street Journal* further reinforces the management view that the only game in town is the microcomputer.

Surviving the Storm

If minicomputer suppliers are to survive the storm, they will have to strengthen the management awareness of their computers' value as an application solution to business problems. The microcomputer's ability to be utilized as a universal workstation will have to be weighed against the minicomputer's ability to offer multiuser environments, more muscle and more shared storage. The need for creative marketing to raise management awareness of perceived value is a critical element in the strategic success of minicomputer suppliers.

As more and more microcomputers are used to educate management, it becomes easier for managers to accept the "McDonalds" approach to learning. If you grew up in the McDonalds age of fast, convenient hamburgers, you may have replaced the generic term "hamburger" with "McDonalds."

If you were educated on the microcomputer, you may be predisposed to using it because of your own experience with its capabilities.

Paoni is president of Personal Computer Management, Inc., Wheaton, Ill.

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Micros, Minis To Coexist As Marts Mature

(Continued from SR/24)

lation is achieved, performance is usually severely impaired.

More specifically, minicomputer manufacturers must clearly define the market segment they want to address. They must look at that market in terms of the fit of their products or proposed products. They must evaluate for that market whether their competition will be micros or mainframes to determine if the mini is best suited for that application.

Then, and most important, they must customize their systems to achieve maximum performance for their customers. This customizing must include hardware, software and, if necessary, price.

While the minicomputer is unlikely to take over the microcomputer market, defined markets and applications that are more suited to either the minicomputer or the micro ensure their coexistence.

Another area often overlooked is the technological advances that are enhancing both the micro and the mini. Micro-coded and microprocessor peripheral controllers and peripherals are enhancing the performance of the minicomputer.

With an aggressive "open-eye" approach, the minicomputer manufacturer will coexist with microcomputer manufacturers.

Jacobson is president of Second Source Computers, Inc.

Superminis Have Rosy Future as 'Hybrid' Hosts

By Frank Madren
Special to CW‡

Much attention has been focused of late on the microprocessor revolution. This revolution has affected the way many professionals handle the information needs of their work environments.

While many microcomputers are used in individual applications, microcomputer networking and the need to access more computer power and high-powered peripherals has led to a growth in "hybrid" systems — networked combinations of computers of varying levels of power.

Superminis will play a major new role in this marketplace as hosts to the network of smaller systems. Supermini growth over the next few years will match that of microcomputers in compound annual growth rates.

Microcomputers and the new supermicros have accelerated computer understanding and acceptance in a broad sector of the population. As an extension of the distributed processing trend initiated by minicomputers in the '60s, micros have made computer power both highly accessible and inexpensive enough to attract the interest of the professional population outside of the computer room.

Microcomputers excel at providing local computer power to streamline individual manual activities (such as spreadsheets, word processing and design and documentation tools for engineering and software development). As microcomputers fostered comfort, they also fostered the desire for increased computer power and the ability to communicate and share data.

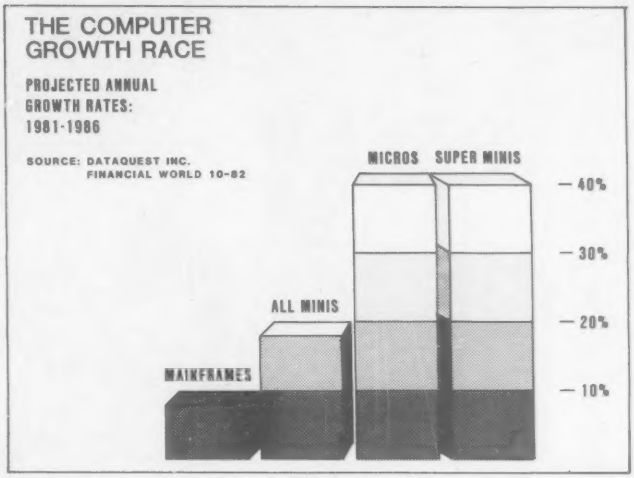


Figure 1

Much of the impetus toward solving this new computer power crisis is directed toward more sophisticated operating environments and microcomputers. To a degree, the networking of micros or the concatenation of microprocessor chips into a supermicro will answer the need for increased communications between individual computing activities.

However, major power increases will be recognized as microcomputer networks and individual workstations are combined with high-end minicomputer power to provide for the large computing jobs and massive storage requirements that are not well served by dividing tasks among numerous microcomputer systems.

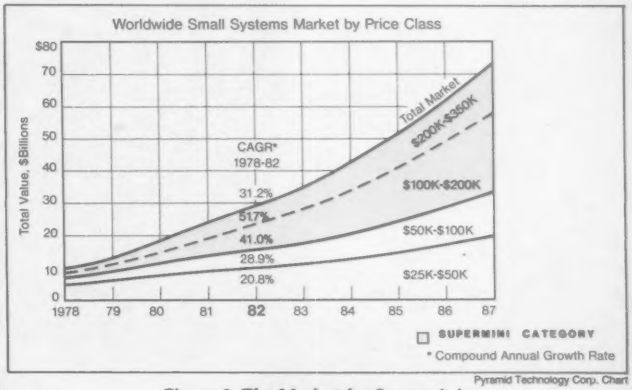
A hierarchical arrangement of micros and superminis will provide the balance of computer services necessary to meet the growing demands of the professional work force.

Although the delineations between the different classes of computers have become increasingly blurred as vendors strive to associate themselves with the next higher level or to differentiate themselves from others in their class, there are several rules of thumb to follow in determining the various classes of computing power — the needs the computer is intended to satisfy and a comparison of the relationship of that category to other standards.

Micros are oriented toward individual tasks; superminis and mainframes are oriented to handle large volumes of data and feature systems targeted to large computing jobs and/or on-line numbering from 16 to upwards of 100.

Some characteristics of these larg-

(Continued on SR/30)



Pyramid Technology Corp. Chart

Figure 2. The Market for Superminis

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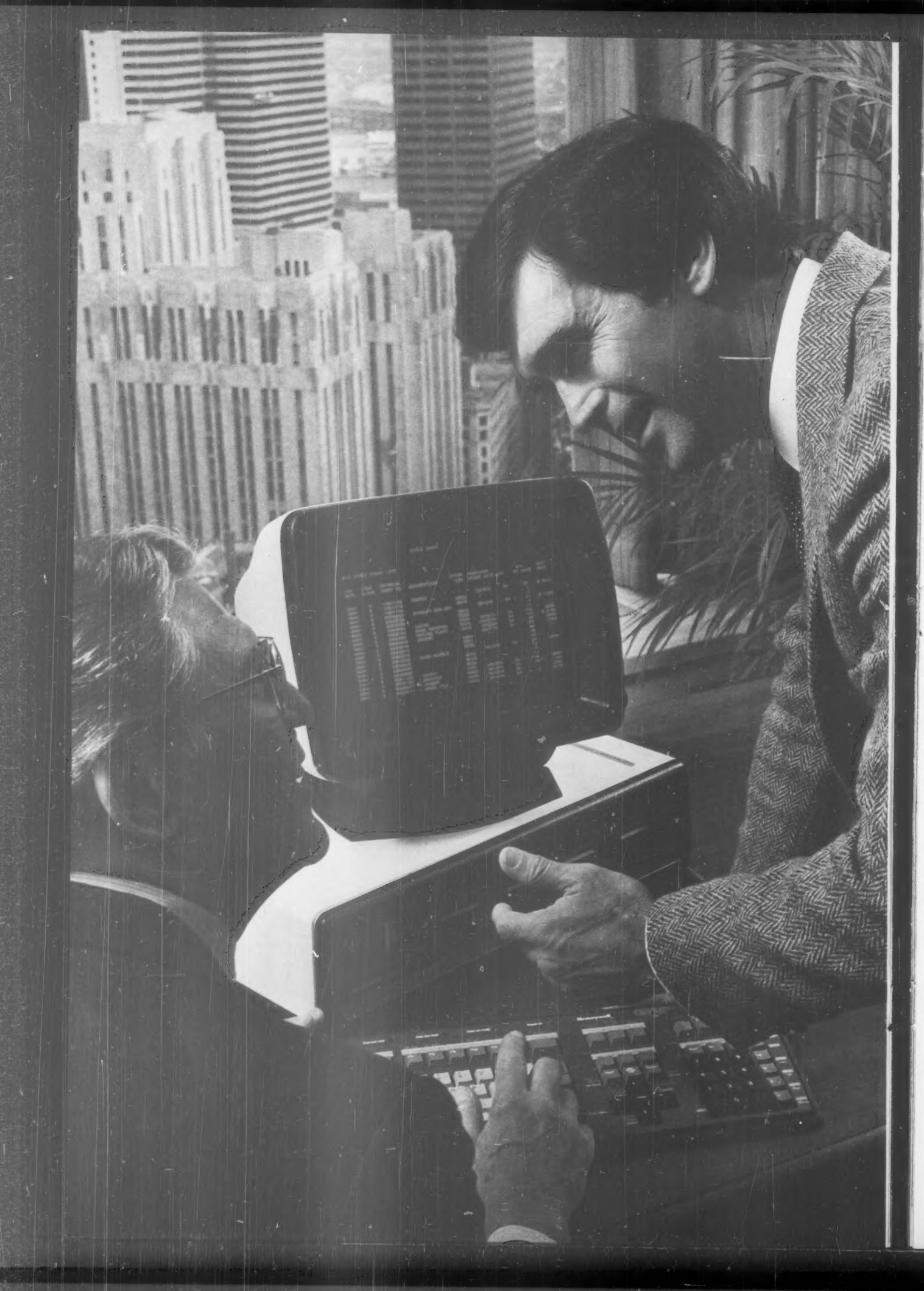
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'Hybrid' Host Role Ensures Minis Rosy Future

(Continued from SR/27)

er systems follow. The CPUs of these machines are proprietary to vendors and incorporate micro-programmed instruction sets. The CPUs were designed using fast Schottky transistor-to-transistor or emitter-coupled logic. Typically, this provides a performance level as yet unreached by the MOS technology of microprocessors.

Dedicated consoles are provided for the systems manager. High-speed bus band widths run from 12M bytes upwards. Disk capability is normally ½G byte or larger, and main system memory is counted in multiple megabytes.

Software has been developed over time to include languages with optimizing compilers, virtual memory that does not sacrifice performance and sophisticated operating systems and utilities that can schedule and execute many big jobs without getting bogged down.

In other words, these large machines are used where there is intensive computing work to be done on a sustained basis.

While much of the emphasis today is placed on the effects of the microcomputer on today's business, Dataquest, Inc. forecasts that superminis will enjoy the same high compounded annual growth rate — in the 40% range — as the microcomputer class (see Figure 1 on SR/27). These figures tend to bear out the contention that there are two clear needs patterns and that there can be a symbiotic relationship between these two dynamic areas of the marketplace that answer those needs.

One of the major issues to date in planning the integration of micros into larger computer systems has been the lack of compatibility. The Unix standard makes this less of an issue.

Hierarchical Integration

With the Unix emphasis on high-level language programming and with the availability of standard operating protocol across all computer classes, the hierarchical integration of different levels of computing power can be realized with a high degree of ease.

There are well over 90 separate microcomputer manufacturers that are providing systems oriented to the Unix operating system. Unix is also available for a significant number of mini, supermini and mainframe computers.

An entire departmental network can now be designed using the same fundamental operating principles and development criteria. Tasks can be divided to match the power and needs of the class of station that will be assigned to handle the task.

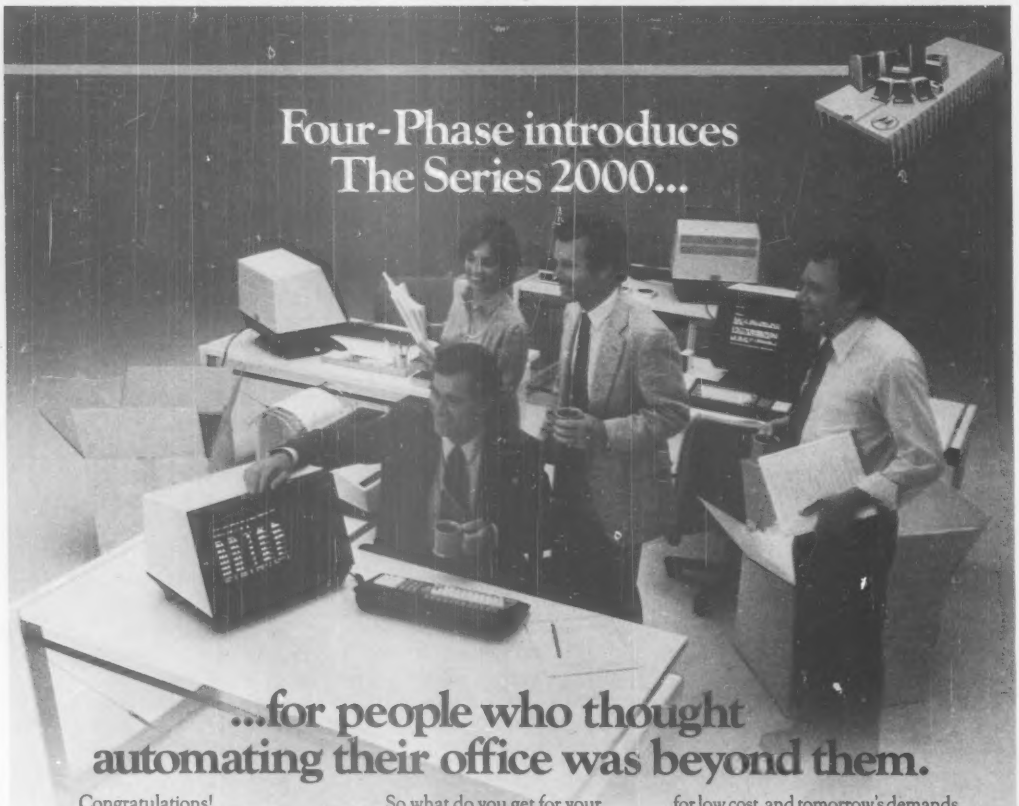
Much of the growth in the small systems market (traditional minicomputer territory) is seen in the high end of the range (see Figure 2 on SR/27). Along with traditional functions, such as departmental computing and software development, much of the growth will be tied to the emergence of the microcomputer workstation/supermini hierarchy of information management.

Eileen Skrabutenas of Yates Ventures calls Unix the "glue" that allows the networking of different classes of systems and a key contributor to the growth of both superminis and micros.

An area that highlights this hierarchical computing trend is the automation of the engineering professional. Most new engineering software is being written for Unix-based machines.

As such, the varying phases of an activity can be assigned or reassigned to different parts of the network. Finite element analysis, for example, is divided into

(Continued on SR/32)



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Micro or Mini? It Depends on Size of Business

By Richard J. Surdez
Special to CW‡

What's a data processing manager to do: stand by the traditional minicomputer method of satisfying the company's data processing requirements or disseminate personal computers throughout the organization to serve the needs of individual users?

This conflict is really a "what's good for me" vs. "what's good for the company" situation, an unhealthy environment in which there can be no winner.

Individual corporate users can solve their own requirements with the purchase of micros or personal computers of various shapes and sizes, but they usually neglect to consider the overall information-sharing and communications abilities of their systems required to make their businesses function and grow.

On the other hand, a minicomputer is extremely powerful and can certainly accommodate the current and future data processing requirements of a business. But does it attempt to meet the individual needs of clerks, secretaries, executives and other employees who would benefit from the availability of such productivity tools at their own workstations?

Ideally, the best solution would be a system that provides both individual and corporate functions combined in a single networked solution. Such a system would address the needs of the entire organization, which include those of the individual, the department, the company (intracompany) and the corporate structure (intercompany).

'A minicomputer with multiple workstations can meet . . . local requirements at a more cost-effective rate per workstation than is possible with an array of micros. [It] can allow resources to be shared among all users and can also serve as the network link to obtain and provide data to the mainframe.'

The size and scope of the typical small business make communication and information sharing easy. Given this, the small business selecting a mini or micro is confronted with a less complicated decision than that faced by a larger organization.

A small business will usually require automation in only a few key areas, all of which involve a select number of applications and individuals. For example, the accounting department may require a micro to generate key account management reports and financial statements, while office automation functions such as financial and "what-if" analysis do not justify the use of a computer.

The large organization, which will usually conduct business from a number of geographically dispersed locations, must select a system that can distribute the work load among various locations as well as provide a communications path back to the central site.

Clearly, a minicomputer with multiple workstations can meet the local requirements at a more cost-effective rate per workstation than is possible with an array of micros. The mini can allow resources to be shared among all users and can also serve as the network link to obtain and provide data to the mainframe.

Ideally, this network system will also provide individual office productivity tools to its users by supporting a personal computing function. If this is true, the advantages of the micro quickly disappear when compared with the multifunctionality of a workstation in a distributed data processing (DDP) environment.

As an example, the availability of Digital Research, Inc.'s CP/M on a DDP system provides users with the advantages of a personal computer without having them sacrifice the superior networking or shared resource processing, storage and printing capabilities of a full-function DDP system.

Users can access remote host computers or local shared data bases as well as the more than 2,000 software packages available under CP/M. CP/M on a DDP system expands the versatility and flexibility of the system without the addition of new hardware. Peripherals and software are shared by users, thus minimizing overall costs.

An added benefit of this approach is the control and compatibility of systems within the organization. Current and future requirements can be planned for and implemented within the network because of the inherent compatibility of hardware and software.

It simply becomes too costly to configure a micro with the storage and communications required to participate in the communication of information throughout the organization. Until local-area network standards become well established and easily implemented, the minicomputer, with personal computing

(Continued on SR/32)

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Checklist of Needs

Does Your Company Require a Minicomputer?

By Larry Boyd
Special to CW‡

When a company's needs require changing data into information, minicomputers have many advantages over micros. Not all businesses have the need for a minicomputer, and many do not know how to decide whether or not they do.

A small business with few employees and products normally does not need a mini and often cannot afford the investment. But a business with many clients and products could benefit greatly from the information a mini can make available.

A basic checklist for whether or not a business needs a mini would include the following:

- Large amounts of data.
- A number of users using the same applications concurrently.
- A number of applications accessing the same core data.
- A number of applications accessing several sets of data banks.

One advantage minis have over micros is that many users can access the same information simultaneously. For example, a business that has 5,000 clients and a hundred employees may wish to have accounts receivable, accounts payable, payments receivable, client history and word processing on its system.

By making available a core data file of the names and addresses of all current, past and prospective clients, in addition to all employees, these systems can be integrated to allow 50 to 75 users at one time.

Concurrently, a form letter can be written to prospective clients; five collection terminals can access up-to-date information on past-due clients; 10 accounts receivable terminals can enter daily receipts; and 25 telephone operators can maintain sales information.

With micros, there is duplicate information spread out on many disks. Account payments, entered by the accounts receivable department, do not automatically appear on the collection department's disk.

Mini Grows With Business

As the company grows, so can the mini. Many micros are very limited as to the number and size of disk drives they can support online. You can change disks quickly with micros, but with minis there is less need to change disks because the information is always online.

If another disk drive is necessary for the mini, it can be purchased and put on-line in a relatively short time, allowing for more information growth.

Backup is necessary with any computer system. With micros, it is difficult to keep current backup available to all users. Users can be asked to back up their own data, but often there is "not enough time" or the user "forgets how."

With minis, the backup is controlled by the management information systems (MIS) department. This allows for more consistent and correctly executed backups. The mini can also back up more information faster than a micro.

Users, of course, like to have control over their own systems. Often, users do not believe the MIS department can produce what they want *now*. They claim that with a micro they can produce their exact needs.

Although this is somewhat true, with the correct tools available on minis, the users can design, build and execute their own small systems.

The main advantages minis have over micros is data control and security. If an unauthorized employee has a micro at home, he often has the ability to access secured data with no one's knowledge.

Because of necessary signons to minis, this can be observed by computer operations. It is not possible to keep an employee who thinks he is a computer whiz, and is, out of any system, but with a mini the employee who wants to "experiment" can usually be deterred.

The control of information in a growing business is important to monitor. Keeping all information correct is hard enough on a micro, because of disks that float from

(Continued on SR/34)

Mini or Micro Decision Depends on Size of Firm

(Continued from SR/31)

and communications capabilities, offers the best route to automating larger organizations successfully.

On a smaller scale, a department is to a small business what a company is to the corporate organization. Depending on its size, a department's needs may be satisfied by a micro or by a small mini depending upon how many people need to access the information.

Both should be able to communicate messages and data to other departments if a truly automated solution is to be implemented.

The automation need not, and in all likelihood cannot, take place all at once. But the staged implementation must have full automation as its ultimate goal.

What's a data processing manager to do? He should choose the best of both worlds: personal computing fully integrated with his organization's data processing/data communications network.

Surdez is the director of product line management for Mohawk Data Sciences Corp., Parsippany, N.J.

Superminis to Host Small Systems

(Continued from SR/30)

three main phases: preprocessing, processing and postprocessing.

Preprocessing is highly interactive.

It involves defining the form, material properties, boundary constraints and load or displacement patterns of the problem.

While the resulting file requires from 1M byte to 10M bytes of mass storage, the process of definition can typically be handled at a microprocessor-controlled workstation.

Likewise, the computed results, which are normally expressed as plots, can often be reviewed and edited on micro-based graphics workstations.

The processing phase, however, is more appropriately handled by a supermini-class machine.

Medium to large-size problems can require 10M bytes to 100M bytes of scratch files and can occupy up to 95% of the CPU time, a very good argument for offloading preprocessing and postprocessing operations.

A complex problem may tie up a Digital Equipment Corp. VAX 11/780-class system for several hours as the program forms and solves tens of thousands of simultaneous equations.

The computer industry has been well served by the introduction of the microcomputer and its emphasis on standards.

As the industry shifts to accommodate this latest level of distributed processing, it also acknowledges a rebirth of the need for centralized functions.

The supermini/micro combination offers a new level of productivity and flexibility in the distribution of information manipulation and handling activities.

Madren is vice-president of marketing for Pyramid Technology Corp. in Mountain View, Calif.

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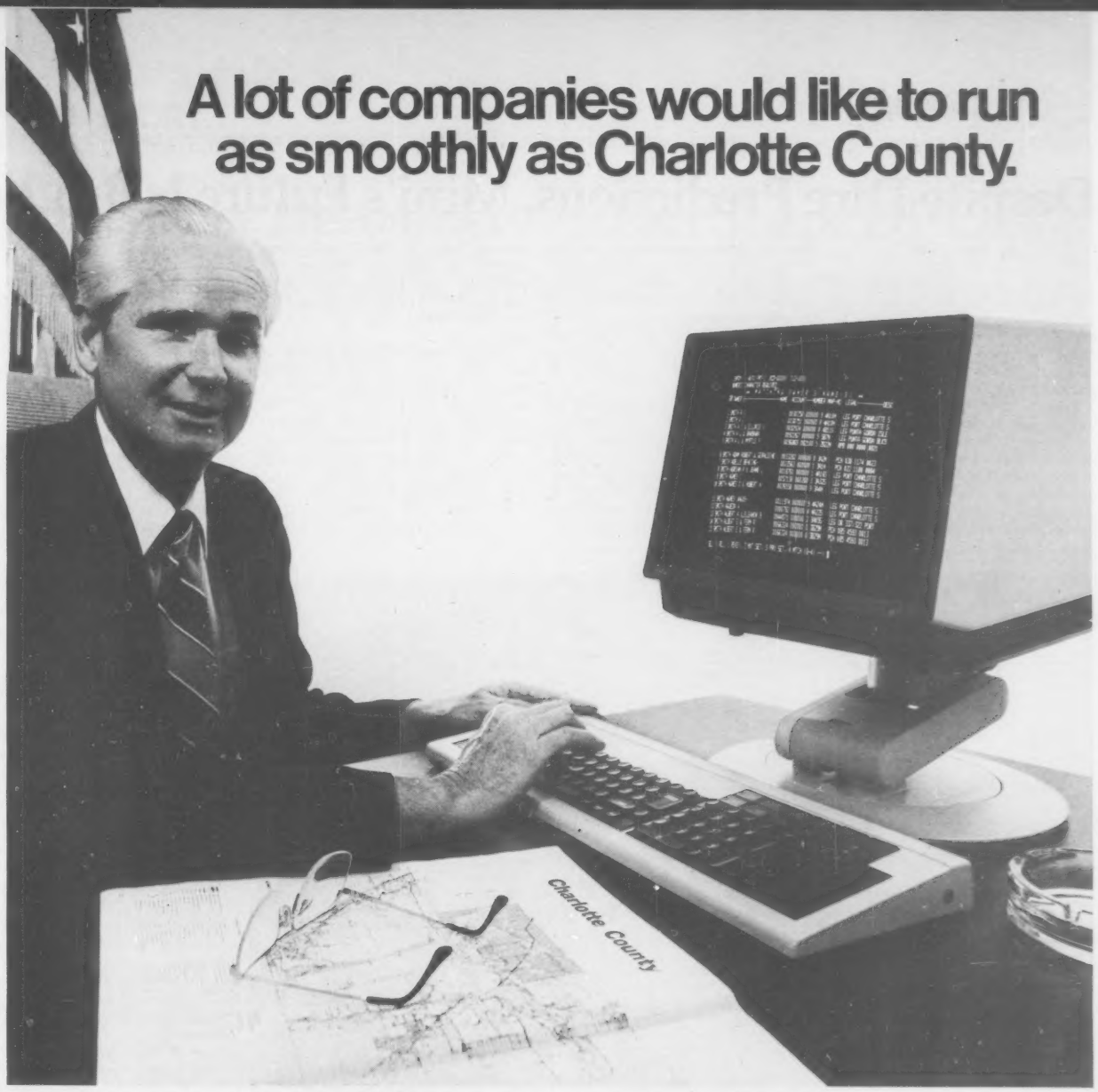
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As Oliver Lowe, Charlotte County's Property Appraiser, and the driving force behind the implementation of the Nixdorf 600/55 computer system, puts it, "One of the primary obligations of any government agency, regardless of size, is the elimination of unnecessary expense and duplication of effort. With the Nixdorf system, we are able to meet the data and information processing needs of all county departments, and at the same time, make the information used by one organization available to any other department that might need it. We're comparable with private enterprise when it comes to efficient management."

The Nixdorf system handles the complete range of the county's administrative functions from property appraisal, tax collecting, license and registration renewals, payroll, and mosquito control to a number of law enforcement requirements.

Another reason for the selection of the Nixdorf system, according to Mr. Lowe, was its ease of use. The system is being run by people who had never operated a data processing system before. No computer specialists had to be hired. And that's a major factor in Charlotte County's ability to save hundreds of thousands of dollars.

For 31 years, Nixdorf has been providing solutions for the information processing needs of all kinds of businesses, as well as government agencies at the local, state and Federal level. And today, we're a successful international company with 16,000 people and over 110,000 computer systems installed around the world.

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Despite Dire Predictions, Mini's Future Is Bright

By Gerry Petri
Special to CW‡

Despite the predictions made one and two years ago that minis would be supplanted by the burgeoning array of microcomputers, the future of minis has never looked brighter. Ironically, this is due in large part to microcomputers.

First, microcomputers have helped take automation power into markets and companies that had never used computers before. Experience demonstrates that once any company gets a taste of what a computer can accomplish in savings of time, personnel and money, the demands on the computer system expand rapidly. A company that bought its computer to do payroll or mailing lists now wants to carry out applications involving inventory control, point-of-sale and materials handling. The company's terminal requirements jump from one or two to 25, 40 or more terminals.

At this point, these kinds of requirements become a minicomputer's best friend. Minicomputers have the effective power and the sophisticated, proven operating systems necessary to sustain high throughput and response rates even when burdened with heavy transaction processing loads imposed by a large number of terminals. Also on the plus side, minis have accumulated a huge library of proven business software directed at many vertical markets.

Another impetus to the growth of the mini market is the increasing need to interconnect large numbers of personal computers in local-area networks. The multiuser requirements of most companies demand not only a large number of terminals, but also that these terminals have access to a common data base. This need is most appropriately filled today by a minicomputer system that typically has a secure, centralized mass storage system and the power to share it among multiple users.

The rapidly declining cost and size of the minicomputer is another factor in its increasing market growth. Because of its ability to share a large data base and processing power among many users, the typical minicomputer system, on a per-user basis, often costs $1,500 to $2,500. As the multiuser demand grows, the per-user cost becomes the most important dollar figure. In addition, more and more minis are being introduced that meet the demands of the contemporary office.

The answer to the question, "Where are the new markets for minicomputers?"is "Anywhere cost-effective multiuser capability is required." It is interesting to note that while the mini began in the early '70s primarily as a single-user scientific calculation device, it has evolved into the principal tool of the small to medium-size business. As was stated before, the key to the minicomputer's importance in business is the requirement for large multikeyed data bases capable of delivering immediate retrieval and updating to a series of professional and clerical workstations, which are all logically connected to the same applications functions.

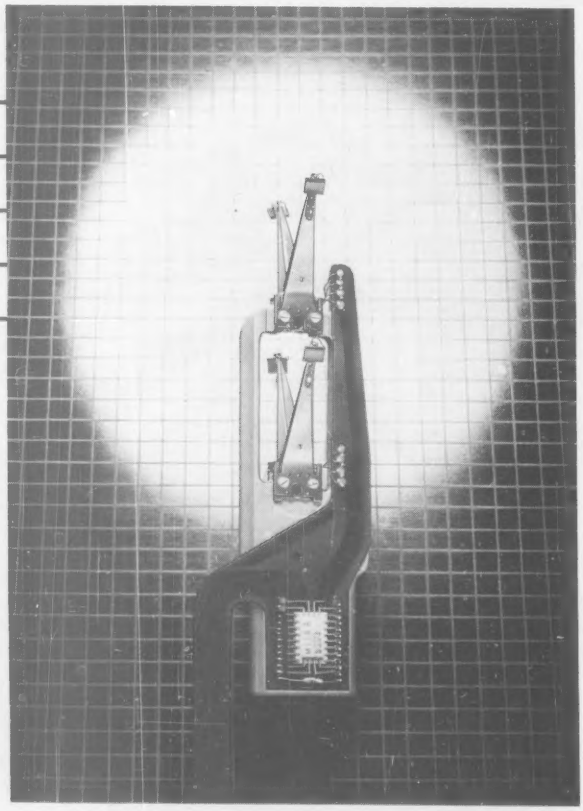
Fastest Growing Mini Markets

Certain types of businesses have a need to access a central data base and, therefore, can be identified as the fastest growing mini markets. Some of these are new opportunities, while others are traditional customers whose requirements continue to increase.

One of the fastest growing markets for minicomputers is in the professional services area, primarily medical and dental applications in which multiple doctors' offices, clin-

(Continued on SR/36)

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CONTROL DATA

Company Needs Will Determine If Mini is Best

(Continued from SR/32)

one micro to another, but to keep the structural integrity of integrated systems on a micro correct is almost an impossibility.

The integrity of information is more easily controlled when it is not duplicated throughout systems. The mini encourages nonduplicated data through core data banks. When information is found to be invalid, it can be maintained in only one location, making it possible to correct it quickly and still control the integrity of the whole system.

If a business requires a mini, its information advantages over the micro include: multiple information access by users concurrently, growth capabilities of information storage and backup speed and control.

Boyd is a programmer/analyst for Falcon Crude Transport and Trading Co. in Abilene, Texas.

Maintenance Needs, Service Pact Shape DP Cost

By Frank Fabiano
Special to CW‡

The total cost of any data processing system does not consist only of the price of the equipment and software. Before purchasing any new or additional computer equipment, carefully examine your maintenance needs and the type of service contract most suited to your business needs.

There are three basic types of maintenance contracts available:

- **Time and materials billing.** This agreement is not strictly a contract; you pay for the service engineer's time on the service call and the materials used to make repairs. This type of arrangement can include a ceiling cost; for example, you may contract for a $1,000 limit against which time and materials would be charged. This type of service is usually done at your place of business.
- **Return to depot.** The most economical of all service agreements, this contract requires you to bring the equipment to the engineer's shop for repair.
- **On-site.** The technician comes to the work place to repair the equipment, eliminating transportation time. An on-site service contract generally costs approximately 15% of the selling price of the equipment.

Each type of service agreement offers its own advantages and disadvantages, and these must be weighed before you select on the basis of price or overall efficiency.

Time and materials billing, for instance, would be suitable for any type of equipment *if* only one service call was required. This is rarely the case, however.

One-and-a-half service calls, which is the industry standard, place you at the break-even point for an annual service contract. You are taking a considerable risk in assuming your computer will not need repairs beyond this average — a risk that could be very costly.

Although on-site service is more expensive than return-to-depot, it is the quickest way to get the user back to doing his or her job. Also, analyzing problems in the environment where they occur is of inestimable value to the engineer, as well as to the user, in avoiding similar problems in the future.

How do you decide which service and maintenance agreement is right for your business? By examining the use of the equipment, its specific functions and the job it must perform, its importance in the overall operation of your business and the abilities of the computer operator.

For instance, you are the owner of an import-export company dealing in machinery parts. Your entire inventory, including parts numbers and prices, as well as purchase orders and invoices, are processed by computer. Obviously, the efficient operation of your equipment is essential to your business's profitability. You depend on your computer and simply cannot have it tied up in transportation and maintenance at the shop.

Also, this type of operation can result in very heavy equipment usage, increasing the possibility of downtime over the industry standard. An on-site service contract is clearly best for you.

Many service companies and manufacturers will conduct this type of business analysis before recommending a maintenance contract for your equipment. But what should you look for in any proposed maintenance contract?

- Built-in protection from price increases, either in the form of an extension to the agreement or a schedule of anticipated annual increases.
- The total number of hours the contract covers; inquire about the approximate number of hours the service company anticipates for specific problems.
- The service company's guaranteed response time.
- Whether or not the service company will provide units on loan in the event a piece of equipment must, for any reason, be returned to the shop or replaced.
- If the contract covers routine, periodic preventive maintenance.
- Be certain the service company's engineers are factory-authorized; this is really the only credential you can check to be assured the technicians are knowledgeable in servicing your product lines.

The final service you should look for in a maintenance agreement is a system for reporting service history. Dataflex Corp., for example, has a procedure which records service calls and the specific problems encountered by serial number.

By utilizing this or a similar problem-tracking system, your service company will be able to analyze your company's service history and determine factors which can affect the life of your computer equipment.

Fabiano is vice-president of sales for Dataflex, Cranford, N.J.

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Its Too Early to Ring Down the Curtain on Minis

(Continued from SR/34)

ic stations and functions are interconnected. Computers are used to maintain complete patient histories, appointment scheduling, accounting, inventory control and the processing of third-party insurance paperwork.

The formidable requirements of today's pharmacies are also being undertaken by multiuser minicomputer systems. Minis are used to orchestrate each patient's profile of medication history and drug interaction, an area of increasing concern in medicine. The same systems maintain control of the pharmacies' large inventories, distribution of certain types of controlled drugs, cross typing of drugs to pharmaceutical codes plus the processing of standard financial applications and all supporting paperwork required by state and federal governments.

Applications that have previously been accomplished by traditional batch processing mainframes more and more are being serviced by on-line minis. Small to medium-size hospitals and patient care facilities are using minis to handle huge amounts of federal and state paperwork as well as care processing, billing and history. The mini provides the power of the former mainframe plus the multiuser interaction necessary to reduce the mountain of paperwork.

Advertising Industry

Another new marketing opportunity for the multiuser mini is the advertising industry. Not only are systems used for typical business functions, such as financial services, planning, labor and materials tracking, but also for "creative" services such as postanalysis of advertising, market research and so on. Copy is handled through integrated word processing.

Some of the largest minicomputer systems are being developed for distribution firms in a wide variety of industries. What unites these companies is the need for instant access to up-to-the-minute data on an enormous inventory.

A typical example is a Point 4 Data Corp. customer who supplies alarm equipment nationwide. This company began with a simple three-user system and today, just two years later, interconnects 70 users in eight branch offices.

The focus of each new market is on cost savings and productivity enhancement for such functions as reservations, check cashing, point-of-sale processing, direct mail, electronic mail, telemarketing, shop scheduling, loading and tracking and financial and inventory accounting.

Equally important as the improved productivity and profitability is the formal systemization that the computer superimposes on what may have been haphazard, highly individualized activities.

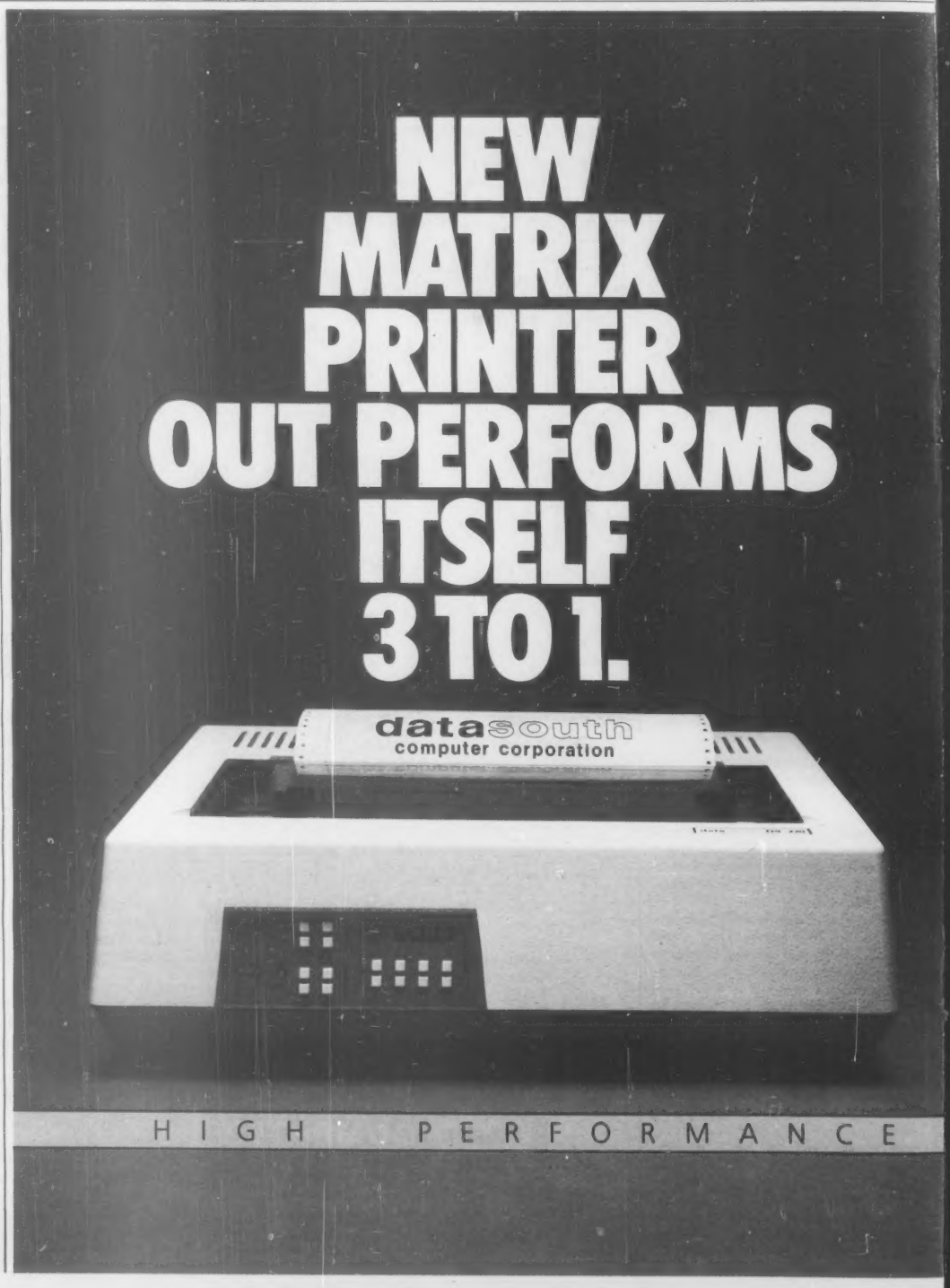
Customers find that swift and consistent automation procedures facilitate swift and consistent customer service levels.

A sure thing in today's fast-changing market is that minis will continue to grow in user capacity and market acceptance. Tomorrow's minicomputer will support hundreds of workstations, many of which will be micro-based.

Today's new users are proving that minicomputers have the proven multiuser file capabilities that both allow fast access to the data base and provide security and integrity in demanding environments.

The minicomputer is a tough act to follow and is getting tougher all the time.

Petri is director of new market development for Point 4 Data Corp.



Increased Storage, User-Friendliness Cited

Micros Seen Benefiting Smaller Businesses Most

By Aristotle Lekacos
Special to CW‡

The fact that microcomputer systems have become remarkably affordable has sent many business people to their local computer stores in quest of easy, economical computerization. There are many reasons why a small or moderate-size business of any sort can benefit from the installation of such a system.

The advent of multiuser systems, increased storage capacities, improvements in user-friendliness and better software have made micros the computers of choice for more and more businesses every day.

Many businesses that wanted to computerize a few years ago, but needed more in the way of applications software than was available for micros, turned to minicomputers. Some found them difficult for their employees to use, as well as expensive, especially with their largely customized software.

Many of these firms have since traded their old minis in for multiuser microcomputer systems, and many new users have gone directly to micros because they are so inexpensive and multifunctional. Applications that would have cost hundreds of thousands of dollars on a mainframe just a few years ago can now be packaged on a micro for well under $50,000. At this cost, a system will often pay for itself within a year, if properly utilized.

Thanks to microprocessor technology, small to medium-size businesses may stand to achieve the greatest dollar-for-dollar benefit from investment in a computer system. This is due to the low cost of investing in a microcomputer and the power contained in these systems relative to their size and cost.

Faster Transition

Besides the basic cost of the machinery itself, a great portion of the financial benefit offered by a microcomputer lies in training. If the software is good and the documentation well written, the transition to a microcomputer is faster, easier and less costly than transition to a mini.

One California businessman using microcomputer software compared the costs with that of a popular minicomputer he had previously used. The mini, with software, had cost $175,000; training costs amounted to $35,000. His microcomputer and software cost $30,000, with "virtually no training costs."

Although the hardware in micros is still relatively inexpensive, the storage capacities of today's hard disks have become considerable, as have the speeds with which the disk drives react to user requests. A system with eight terminals in use simultaneously can still respond to each user's request as quickly as if the user were the only one on the system.

Hardware is only one factor in the overall operational speed of a system. Software design, training and other factors each play an important role. But the simple addition of all those extra terminals makes it possible for a system to reach out and automate every department of a modest-size company.

The first microcomputers were not seen as very useful to businesses, being, for the most part, single-user systems with only very general accounting packages. Even as new packages were made available, the result was no-

(Continued on SR/38)

INTRODUCING THE NEW DS220 MULTI-MODE MATRIX PRINTER

In the beginning was the Datasouth DS180. A printer that *defined* high performance printing, with a balance of high technology design and mechanical simplicity. A high throughput printer that produced clean hardcopy under the most severe conditions.

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The Datasouth DS220 redefines high performance for multimode printing the way the DS180 did for data quality printing.

For speed, the DS220 combines a 220 CPS print speed with servo-controlled logic seeking and high-speed tabbing over blank spaces. This allows the DS220 to zip instantly from one printable character to the next. In side-by-side tests of real-task performance—not just spec-sheet comparisons—the DS220 out performs its rivals time after time.

For correspondence, the DS220 uses its 40 CPS bi-directional NLQ mode to form characters with the precision and clarity you would expect from a word processing printer.

And for graphics, the DS220 adds high performance artistry to popular microcomputer applications programs through high-resolution, dot-addressable output. Sharp new details emerge from business charts and graphs, and from engineering drawings.

The sum is even more than three printers in one. The DS220 offers a total of eleven different pitches and fonts along with seven international character sets. Plus non-volatile space for up to 64 do-it-yourself characters for downloading from the host computer.

And those are just the printing capabilities. In other respects, the DS220 outperforms not just itself but virtually every other printer on the market. Its front panel programming sets new standards in user friendly printer ergonomics. Its four digit LED display and push button panel allow programming of over fifty features, with a minimum of fuss and confusion. Those features include a variety of interface and communications selections that allow compatibility with a wide range of mini and microcomputers. And the DS220 handles six part forms with its adjustable tractor feed, as well as cut sheets and letterhead with its friction feed.

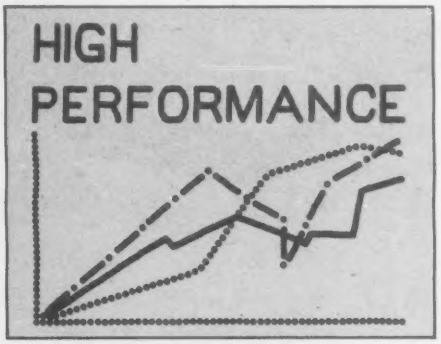
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Smaller Businesses Gaining Most From Micros

(Continued from SR/37)

where near complete computerization because the packages were not often integrated. Data relevant to several separate files had to be entered separately.

Because some software companies have put the extra time and research into the development of integrated software packages, micro users can now realize much more of what their systems are theoretically capable of providing. Not only is there a program for each business function, but they can be fully integrated so that all files are completely up to date on information relevant to them, no matter where the data was placed. This brings the user that much closer to the system's full time-saving potential.

Industry-Tailored Aids

One of the most important improvements in microcomputers, however, came with the development of vertical-market or industry-tailored software. Standard horizontal software was designed to handle a function or functions that might be common to many different businesses, such as payroll or accounts receivable.

With a number of these on a system, the business might be completely computerized. But even then, the various packages would probably not be integrated, and they might need modifications in order for the various functions to be performed the way they are in a given business.

Vertical-market software, on the other hand, was designed to automate all the business procedures of any one type of business, in the way the procedures are performed within that industry. This makes vertical software packages more extensive and somewhat more costly than the others, but what they provide is essentially custom-tailored software, off the shelf.

A multiuser microcomputer system with user-friendly software that provides integrated programs enables every department of a business to improve its operations.

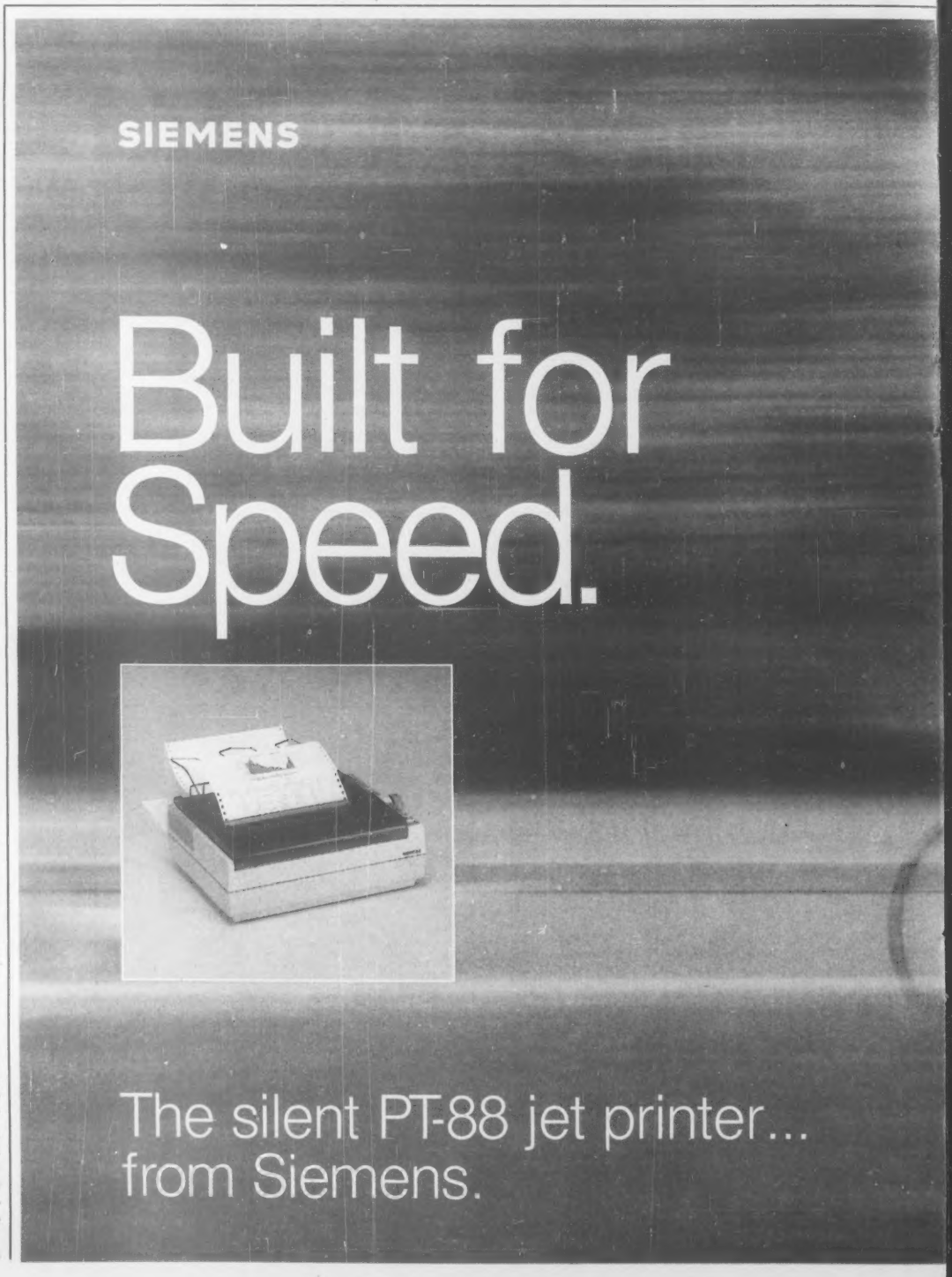
Part of the reason microcomputers are so appropriate for small businesses is because they are intended for the nontechnical, non-DP employee. A wholesaler with about 25 employees can make the system available to at least half of them, because training with a properly designed system can be quite easy.

User-friendly software is being designed more and more with the end user in mind, especially when the software designer has spent some time with such end users, learning how they conduct their businesses and what kinds of prompts make sense to them. When bookkeepers are as comfortable with the computer as they are with their ledger books, productivity increases significantly. Of course, one should sample the merchandise to make sure one's employees will, in fact, relate well to it.

Sometimes the results are seen indirectly. One manufacturer who used his system's word processing function to improve correspondence, including sending out monthly statements (which he had not been able to do previously), reported that receivables had been sped up by 14 days.

Planning for and dealing successfully with the growth of a business is an area where a micro can be invaluable to a small business. The organizational and computational power of a computer makes the growth process just another set of calculations for many business people, enabling their businesses to grow that much faster.

Lekacos is president of Trac Line Software, Inc. in Hicksville, N.Y.



Mini Strikes Back With Compact Packaging

By Richard Dohrmann
And Michael Liccardo
Special to CW‡

For the minicomputer, the OEM has been both a blessing and a curse. Wide OEM acceptance has, of course, contributed to a rich base of applications software. But the lack of more direct channels of distribution has tended to limit the minicomputer market unnecessarily.

As a result, microcomputers, particularly the larger multiuser systems dubbed "supermicros," have gotten a foothold into business installations. But while supermicros may have gained the lion's share of the attention, for many installations, the embracing of micros to the exclusion of minis is similar to tossing the baby out with the bathwater.

Minicomputer software, in particular, is more sophisticated and cost-effective than its microcomputer counterpart. Moreover, the same advances that have made the microcomputer a bargain apply to minis as well.

More compact packaging, lower production costs and less expensive media drives are moving the price of systems downward. Far from heading toward extinction, the minicomputer is striking back.

Consider, for example, Digital Equipment Corp.'s PDP-11, the most widely used minicomputer in the world. Although many of the PDP-11's early applications were in technical installations — research labs, process-control environments, universities — DEC has also developed a following in the commercial market.



OEM Dominance

This domain has been dominated almost exclusively by the OEM, who configures the machine individually for his customer, adds the appropriate software (which is generally proprietary) and sells it on a turnkey basis.

The OEM's strong suit is customization. But the process is expensive; configuring computers in a unique fashion for each customer increases overhead at every stage.

So, while the OEM seeks to lower prices through lower hardware and software development costs, minicomputer manufacturers and software publishers are pursuing a parallel path — looking for more direct channels of distribution by lowering the costs of their systems and reducing the amount of in-house or outside expertise required to keep them running.

A clear trend at the hardware end is toward more compact minicomputer packaging that is able to compete with high-end micros for price and features, yet maintain compatibility with the large base of minicomputer software.

The size reduction permits a smaller power supply that generates less heat. As a result, these systems can run unobtrusively from a desktop, instead of being housed in a dedicated, air-conditioned room.

The PDP-11 architecture is a natural for this type of repackaging. In the commercial market, it is often sold as a time-sharing system supporting from three to 16 users, and it supports a rich library of application software.

The recently unveiled micro PDP-11 from DEC reveals some of the potential for such a mini. The demand for the product has created such a backlog that the company cannot manufacture enough of them.

These systems are not only comparable with an installation's existing PDP-11s, they can also be networked within a PDP-11 or DEC VAX-11 environment. In

(Continued on SR/40)

Lower Costs Help Put Mini Back in Driver's Seat

(Continued from SR/39)

contrast to the purchase of a supermicro, where the installation enters at the high end of the technology, a small minicomputer represents the low end of the minicomputer world, affording virtually unlimited expansion.

The large-scale integration processor, although proprietary to DEC, represents an island of stability when compared with the microcomputer realm. The only micro-based CPU to deliver comparable performance has been the Motorola, Inc. 68000.

Yet Unix, the prime operating system for this processor, is represented by so many proprietary versions that there really is no standard in that marketplace. This is also true of C compilers, making program development difficult for more than one machine.

Operating System

Another advantage supermicros have had over minicomputers has been in the operating system. Minicomputer operating systems were designed on the assumption that either an in-house expert or outside consultant would oversee their use. Consequently, a system generation can take several hours to complete yet must be done each time a terminal or other peripheral is added.

Clearly, what is needed is a minicomputer operating system that is easier to use and reconfigure, yet maintains its power.

Minicomputer operating systems such as DEC's RT-11 have been written with large systems in mind, rather than migrating upward. MP/M 86, for example, Digital Research, Inc.'s 16-bit, multiuser version of it's CP/M operating system, has roots in the small 8-bit arena. The more ubiquitous Microsoft, Inc. MS-DOS, found on the IBM Personal Computer and its look-alikes, doesn't even have a multiuser implementation.

Unlike their microcomputer counterparts, microcomputer operating systems provide data and directory caching, which automatically keeps frequently used file and directory entries in memory, rather than constantly having to fetch them from disk.

Perhaps the greatest strength of minicomputers is their broad base of application software. DEC OEMs have been refining their packages for years, and there is a wealth of them.

In the microcomputer arena, the old standbys like Micropro International Corp.'s Wordstar and Visicorp's Visicalc are certainly bug-free, but they were designed to function within the confined resources of an 8-bit architecture.

When transported to larger systems, they still operate with the same limitations.

This is less true with newer software, of course, but often the packages are so new that early users inevitably act as the final beta site for testing. This problem is accentuated in vertical marketplaces, where microcomputer installations often develop and market software after not finding any for their particular industry. But a part-time software house is hardly in the best position to give full-time support to its users.

The new microcomputer market, rather than sinking minicomputers, will help them thrive. As users demand more and more of their systems, they will eventually see the light and migrate upward. They will, after all, be in the best of company.

Dohrmann is vice-president of marketing at S&H Computer Systems, Inc. in Nashville, Tenn. Liccardo is vice-president of operations for Scientific Micro Systems, Inc. in Mountain View, Calif.

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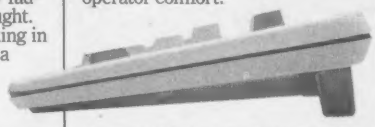
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Formulating a Micro Policy for Your Company

By G.M.K. Hughes
Special to CW‡

Consider this scenario: On a pleasant Sunday afternoon, an Izod-shirt-clad executive who has exhausted the golf and Sunday *New York Times* possibilities, turns to his micro. At the touch of a few buttons, he can display, in simple, multicolored pie charts, the future of civilization as we know it, under any set of assumptions.

Why would these corporate Aladdin's lamps need to be the subject of any policy except, perhaps, that they should not be ordered in less than gross lots? Answer: Because many otherwise sensible people apparently believe what they think they see in the ads and cannot wait to enter the informational Nirvana.

Thus, the information vice-president begins gathering data on which to base a policy.

'The key issues of any micro policy are: What are the appropriate uses of micros?; who approves their acquisition?; and what are the roles of users and systems professionals?'

The key issues of any micro policy are: What are the appropriate uses of micros?; who approves their acquisition?; and what are the roles of users and systems professionals? In broad strokes, appropriate uses are:

- As stand-alone devices for spreadsheets.
- As dumb terminals to mainframes.
- As adjuncts to the mainframe through downloading data for subsequent use by micro software.
- As word processors.
- As graphics drivers.

The policy must also point out to management what the vendors do not — what constitutes inappropriate use. For a big corporation, inappropriate uses include:

- Constructing large data bases.
- Programming by non-systems professionals in detailed languages such as Basic, Cobol and Fortran.
- Transaction processing without the participation of systems professionals.

Management also must be told that the major cost of micros is not the initial $3,000 to $12,000 for hardware plus some software, but the continuing cost of collecting and entering data and of freelance programmers if non-purchased software is used.

Before writing this policy, I looked around to see what others had written. After checking with some DP groups, I was horrified to see request forms that contained such questions as:

- Which "low-level" languages are to be used?
- By application, how many transactions and how many hours is the micro to be used per week?
- What percentage of prime shift is anticipated for each kind of activity?

These questions are 20 years out of date. So far, the policy at the company for which I work is simple: We will lease anybody a micro if he can give a coherent account of how he intends to use it. The key, of course, is the definition of coherent account. To gain that, we need but ask five questions. They are:

- What are you trying to do?
- How do you now do it, if at all?
- Why do you want to use a micro to help you, as opposed to any other alternative?
- How do you propose to get the requisite data from wherever it now exists onto a

(Continued on SR/42)

	ADM 11	ADM 12	ADM 24E
Programmable Function Keys	4 (Shiftable to 8)	16 (Shiftable to 32)	16 (Shiftable to 32)
Non-Volatile Function Keys	Optional	Standard	Standard
Function Key Legends on 25th Line	From Host	From Host	Standard Non-Volatile
No. of Pages of Display Memory	1	2	2 or 4
Page Configurations (Plus 25th message/status line)	24 lines by 80 characters	(2) 24x80 or (1) 48x80 or (1) 24x158	User-Definable up to 96x80
Scrolling	Standard Scrolling	Smooth, Jump or Horizontal Scrolling Split Screen	Smooth or Jump Scroll Split Screen
Transmission Mode	Conversation Mode	Conversation or Block Mode	Conversation or Block Mode
Editing	Limited	Full Editing & Protected Fields	Full Editing & Protected Fields
Visual Attributes: Reduced Intensity, Blink Blank and Reverse Video. Underline also on ADM 12 and ADM 24E	3 Embedded 1 Non-Embedded	5 Embedded or Non-Embedded, plus Full Screen Reverse Video	6 Embedded or Non-Embedded, plus Full Screen Reverse Video and Highlight
OEM Flexibility	Modifiable Set-Up Characteristics	Modifiable Set-Up Characteristics & Personality	Modifiable Set-Up Characteristics. Add to Program in ROM or Down-Line Load in RAM (56K ROM or RAM. Plus up to 22K Display Available) Room for add'l Logic Boards.

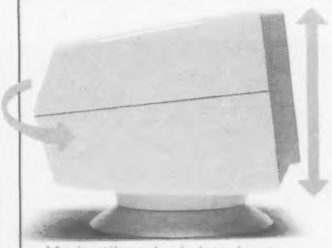
line print, transparent print, and display and print. There are four programmable function keys (shiftable to eight). And two levels of setup mode to reduce errors while still giving the operator maximum flexibility.

For a High Touch terminal with editing and more, choose the ADM 12. It features five non-embedded attributes. Embedded mode can also be selected for existing applications. And 16 programmable non-volatile function keys (shiftable to 32). The display can be configured as two 24 x 80 character pages, or one 48 x 80 page, or one 24 x 158 page. The terminal runs in either conversational or block mode.

Or choose our top-of-the-line ADM 24E which features a moveable 24-line window you can use to look at 48 (or 96) lines of memory. The ADM 24E also offers plenty of additional space for OEMs, with up to 56K ROM or RAM available for add-on programs. Plus up to 22k display RAM.

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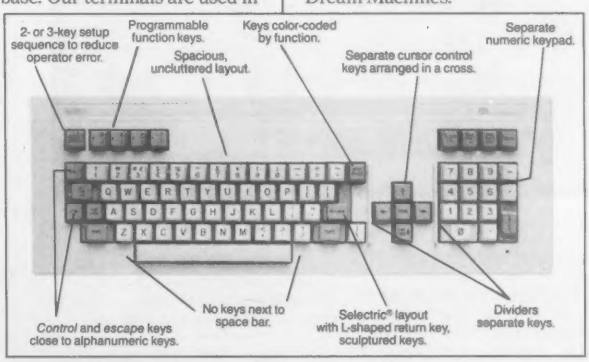


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Systems Programmer at U.S. Steel's Lorain Works with Honeywell, Inc.'s Page Processing System.

Steel Works Turn With Help Of Page Processing System

LORAIN, Ohio — Steel and related products are made here 24 hours a day, seven days a week, at U.S. Steel Corp.'s Lorain Works, located about 30 miles west of Cleveland. Reporting the mill's activity to management every day by 8 a.m. is a formidable task, too, one that a page processing system has handled since July 1982.

Lorain Works operates three daily shifts, each one requiring more than 100 reports — as many as 60,000 pages in a 24-hour period — to keep management up to date on inventory, production, payroll and other accounting statistics.

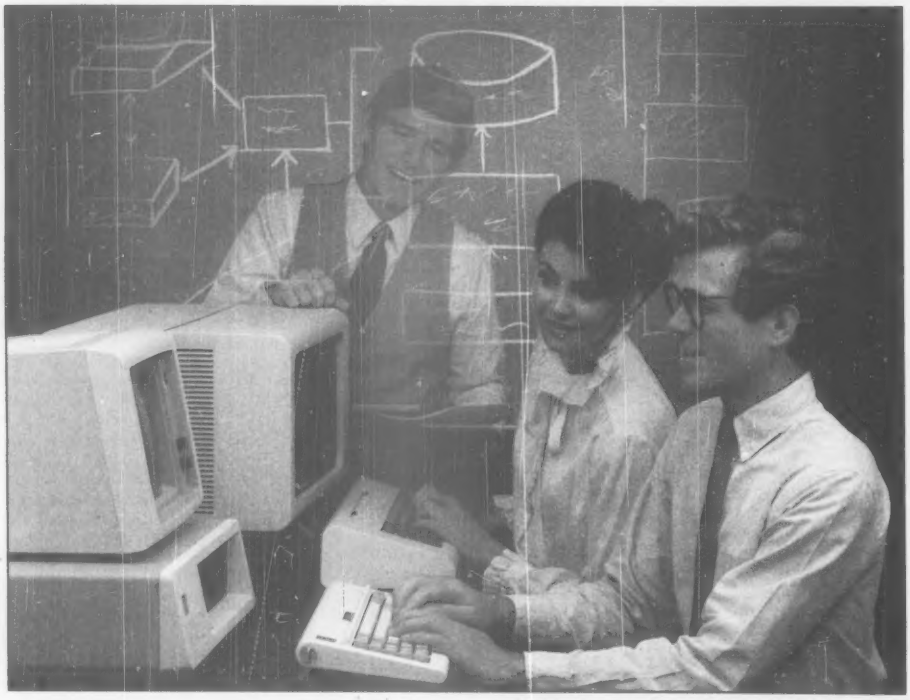
Each report consists of multiple pages and works from a sophisticated U.S. Steel distribution list software program so that reports are delivered early in each day's first shift.

"Our two mainframe computers used to have two impact printers for all that output," said Ray Pasciak, general supervisor for data processing at Lorain Works. "The impact printers did about 1,200 lines/min — not bad for the technology involved, but not nearly fast enough to meet our daily report distribution deadlines consistently."

Pasciak conducted a three-week analysis of paper usage with the im-

(Continued on SR/46)

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Planning A Micro Policy For Your Firm

(Continued from SR/41)

floppy disk?

- What software do you intend to use, and where will you go when you need help?

If a requestor can get through that small catechism, he probably has addressed most of the right issues. With regard to roles, it's the job of systems professionals to set policy for the use of micros, to select and provide the hardware and software and to train and assist in using them.

It is also their job to maintain the data base. We want one set of data; we want it right; we want it up to date; and we don't want it inadvertently or maliciously altered.

As for end users, it is their job to define their problems and at least propose solutions that involve the micro. Beyond stand-alone spreadsheet analyses, end users are to have the facility to query and analyze their data bases, without continual assistance.

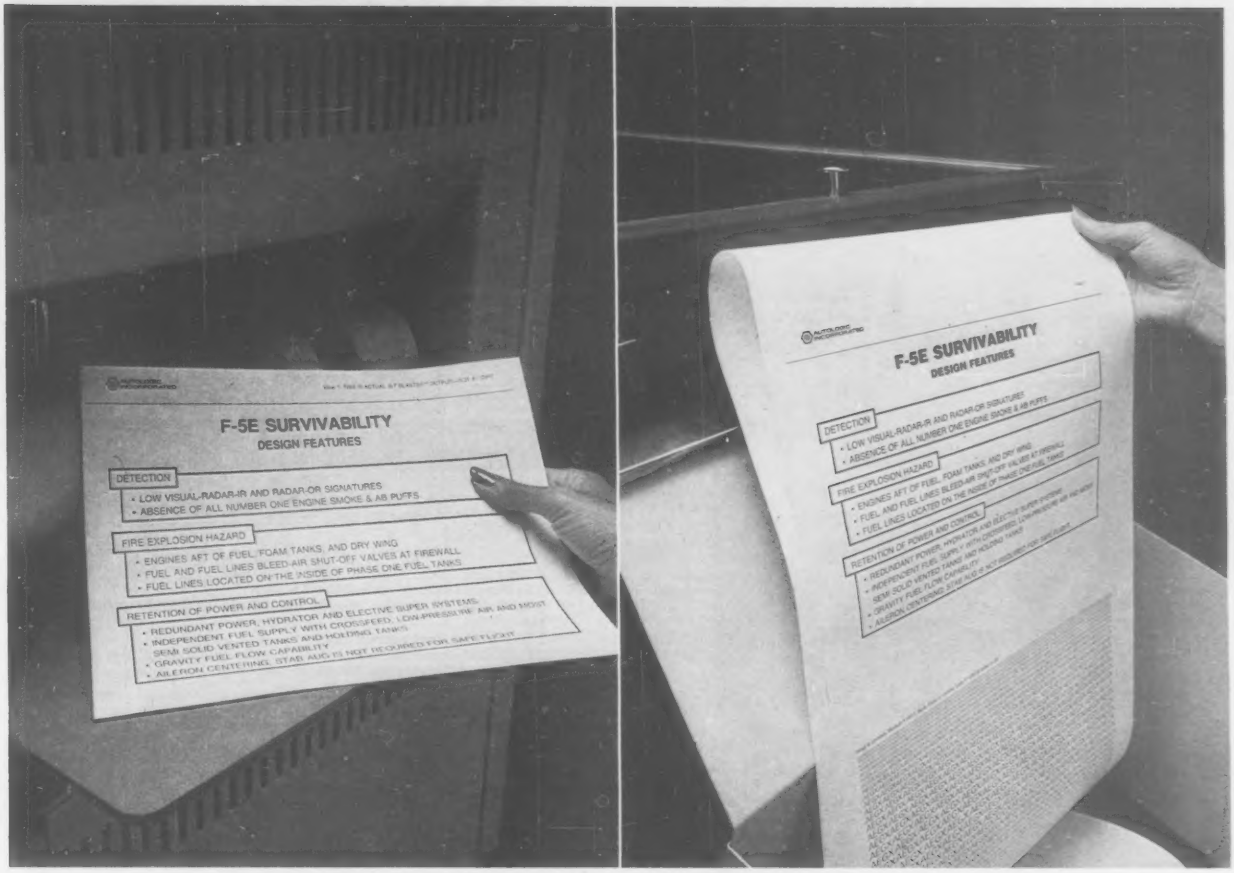
We want to move into an era where they don't call up someone on the systems staff and request that a report that is now 7 inches by 5 inches be changed to 5 inches by 7 inches. They should be given the tools to do that, and much more, themselves.

In summary, our policy on micros is predicated on their being a part of an overall plan for processing information.

Managers will not settle for anything less than facile access to the data they now receive. As we pass through the most turbulent part of the introduction of microcomputer technology, we can at least get from one plateau to the next if we:

- Define appropriate use.
- Decide if a specific request has been subject to some simple tests of reasonableness.
- Point out the areas in which executives and managers are being significantly misled by vendors, either through omission or commission.

Hughes is vice-president for systems and communications at Pfizer Pharmaceuticals, Inc. in New York City.



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The APS-55 Bit Blaster, a page image processor with laser printer, will cut your consumable cost significantly. Before you produce typeset originals, Autologic's APS-55 Bit Blaster will give you proofs which are an exact duplicate of your typeset output. These fully composed pages show the actual fonts, logos and line art graphics to be used.

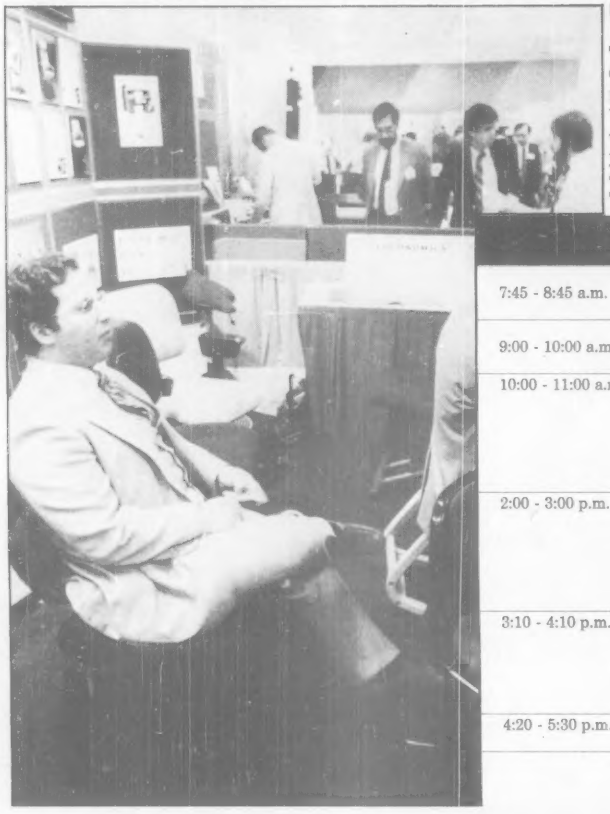


The APS-55 Bit Blaster is offered in two models, a dependent model which is resident in your APS-Micro 5 typesetter, and an independent model which can be used with either the APS-5 or APS-Micro 5 typesetter. The APS-55 Bit Blaster's telecommunications capabilities even allow you to set up remote proofing.

For more information, contact Autologic, Marketing Department, 1050 Rancho Conejo Blvd., Newbury Park, CA 91320 (805) 498-9611.

APS-55 Bit Blaster. Plain paper proofing by Autologic

The Executive Microcomputer Conference and Exposition is coming to The Long Beach Convention Center on October 5-7.



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The EMCE Conference Agenda, October 5-7 1983

THURSDAY, OCTOBER 6, 1983

7:45 - 8:45 a.m.	EYE OPENER: **The Personal Computer in Communications** Dr. Larry Magid, Executive Vice President, Know How, Inc.
9:00 - 10:00 a.m.	**KEYNOTE:** **The Micro/PC Industry: IBM Domination & Future Directions** Adam Osborne, Chairman of the Board, Osborne Computer Corp.
10:00 - 11:00 a.m.	**The Executive/Professional Workstation** John Crudele, Sr. Manager, Management Information Consulting, Arthur Andersen & Co. **Software for Engineering Users** Aki Runchal, President, Analytic and Computational Research, Inc. **Channels of Distribution for Microcomputers** Jim Finke, President, Internetworx, Inc.
2:00 - 3:00 p.m.	**Spreadsheet Applications** Laurence Press, President, Small Systems Group **The Micro-Mainframe Connection** Dick Andersen, Director, AM/MS, Charles Bornheim, Principal, AM/MS; Marc Cummings, Senior Consultant, Mini/Micro Technology, Bank of America. **Packaging & Documenting Software** Howard Zack, Marketing Communications Manager, VisiCorp
3:10 - 4:10 p.m.	**The Future of Business Graphics** Dr. Irwin Jarrett, Chairman and Founder, Fingraph Corp. **The Engineering/Technical Workstation** Glenn Stewart, Industry Marketing Manager, WICAT Systems **The Personal Computer After Market** To be announced
4:20 - 5:30 p.m.	**Micros and the Changing Role of MIS** Dr. Michael Hammer, President, Hammer & Co., Inc.

FRIDAY, OCTOBER 7, 1983

7:45 - 8:45 a.m.	EYE OPENER: **Information Utilities for Personal Computing** Fran Spigai, President, Data Base Services.
9:00 - 10:00 a.m.	**KEYNOTE:** **The Fifth Generation Workstation & Artificial Intelligence** Pamela McCorduck, co-author, "The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge"
10:00 - 11:00 a.m.	**Word Processing for Micros: The Next Step** John Murphy, Vice President, Advanced Office Concepts Corp. **Networking Microcomputers in the Corporate Environment** Arnold M. Roberts, Consultant, ADC Associates **Delivering Good Training and Support to the Corporate User** Karen Orton, Vice President, National Training Systems
2:00 - 3:00 p.m.	**The Information Resource Center** Tom Kosnik, Researcher, Stanford Business School, William G. Haven, Independent Computer Consultant **Portable Computers for Professionals** Doug Mosher, Division Manager, Sybex, Inc. **How to Raise Venture Capital** Moderator: Melody Johnson, Securities Analyst, Cable, Howse & Ragen Panelists: Tom Cable, Partner, Cable, Howse & Cozadd
3:10 - 4:10 p.m.	**Defining Integrated Software** Moderator: Gordon Eubanks, Vice President, Commercial Systems Division, Digital Research, Inc. Panelists: Fred Gibbons, President, Software Publishing; Kurt Lynn, Product Marketing Manager, VisiCorp; Jeanne Mowlds, Quarterdeck Office Systems **DBMS on Microcomputers** Scott Kuklin, Executive Vice President, Helix Corp. **Selling to the Corporate Account: Problems & Pitfalls** William H. Luden, President, ComputerEase
4:20 - 5:30 p.m.	**The Role of Microcomputers in Business** Moderator: Edwin H. Shepard, Product Manager, The Software Products Division, Alexander Grant & Co. Panelists: Richard L. Willmarth, Manager, Office Systems, Storage Technology Corporation; Marc Cummings, Senior Consultant, Mini/Micro Technology, Bank of America.





Special No-Wait tours of the "Spruce Goose" — FREE

EMCE has arranged for after-hours tours of the world's largest airplane, Howard Hughes' famed "Spruce Goose." Tours will be held Wednesday and Thursday, October 5 & 6 from 6:00 - 8:00 PM. You can pick up your free ticket from any exhibitor on the show floor.

Win a Personal Computer

Here's your chance to win the MORROW MICRO DECISION (MD3), the complete desktop system for the small businessman and professional. Just go to the InfoWorld exhibit booth and fill out a ticket. You may be the lucky winner.

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EMCE™
Executive Microcomputer Conference & Exposition

FOUR "IN DEPTH" TUTORIALS
Wednesday, October 5 from 9:00 a.m. - 5:30 p.m.

EMCE's "In Depth" Tutorials are all day seminars for managers who need a comprehensive understanding of one of the topics outlined below. All tutorials include two coffee breaks and a complete course notebook with reference materials. The tutorials will be held at the R.M.S. Queen Mary, Long Beach, CA.

How to Select a Business/Personal Computer

- How to Select the Features You Need
- Determining What Size Computer You Really Need
- What to Look For — and Look Out For — In Your Hardware and Software
- How to Determine What To Spend
- How to Select The Right Software Package For You
- How to Simply Define Your Computer System Requirements
- How to Minimize Costly Professional Help
- How to Select the Best System and Suppliers

Course Instructor: Arnold M. Roberts, president of ADC Associates brings to the tutorial extensive experience in seminar leadership having presented tutorials to managers across the country in the areas of data base management, networking and other application specific areas. Mr. Roberts has over twelve years experience in the field of Business Data Processing, with a strong background in systems analysis and design, technical support, in-house training as well as assisting corporations in the selection and integration of personal computers.

Microcomputers and Local Networks

- Overview of Networking and Definitions
- Hardware Issues
- Interconnection Technologies
- Microcomputers and Components
- Software Issues including Operating Systems
- Centralization vs. Decentralization
- Equipment and Systems: A look at Network Models
- Technology Trends and Future Directions

Course Instructor: J. Scott Haugdahl is a systems specialist at Architecture Technology Corporation, Minneapolis, Minnesota, a consulting firm specializing in computer architecture, including local networks and office systems. His work has included simulation and performance analysis of multi-processor computer systems, design and implementation of servers for local networks, and analysis of the latest developments and product offerings in the local computer network market. Mr. Haugdahl received his B.S.C.S. from the University of Minnesota Institute of Technology in 1980. He is a member of both the IEEE and ACM.

UNIX Tutorial for Managers

- The History of Unix
- UNIX — The Product
- Dynamics of the UNIX Marketplace
- Overview of Available UNIX Products
- Comparison of Hardware Systems
- A look at Application Software
- The Capabilities and Limitations of UNIX

Course Instructor: Jean Yates, president and associates of Yates Ventures specialize in researching UNIX systems, applications and the growing UNIX marketplace. Yates Ventures has been involved in extensive laboratory testing of UNIX related products and has been credited with producing 5 books on the subject. Well-known lecturer and industry consultant, Ms. Yates brings to the seminar both hands-on and technical experience of UNIX and UNIX related products as well as extensive user research.

Business Graphics for Managers

- Assessing Your Hardware Requirements Including Printers, Plotters and CRT's
- Assessing Your Software Requirements Including Operating Systems and Interfaces
- Evaluating Current Business Graphics Software
- Developing and Using Business Graphics Software
- Producing Pie and Bar Charts
- Understanding Program Compatability
- Creating Presentations with Graphic "Slide Shows"

Course Instructor: James Morrison, independent consultant and educator, has trained many people in the area of microcomputers. As a contributing editor to LIST software publication and newsletter, and an evaluation expert for FIRST SOFTWARE, Mr. Morrrison is a true professional in his field. He has published a number of books in the area of process which include subjects such as micro data communications, business software applications and "how to maintain" your microcomputer.

The Executive Microcomputer Workshop
Thursday and Friday, October 6 and 7.

An intensive two-day session for the busy executive or professional who needs to learn the basics of using a personal computer in the least possible amount of time. You'll learn how to use the IBM PC and have concrete experience with Lotus' 1-2-3 integrated software package.

The workshop will be given in conjunction with National Training Systems (NTS), a leader in providing microcomputer training products and sevices to large corporations.

The Executive Microcomputer Workshop will be held at the Long Beach Convention Center. Enrollment is limited.

NATIONAL TRAINING SYSTEMS INC.

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To insure advance receipt of your conference credentials, mail form before September 21, 1983, with check, credit card or P.O. payment to: EMCE, 375 Cochituate Rd., Box 880, Framingham, MA 01701.

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☐ Thursday Only, Conference Program & Exhibition $195

☐ Friday Only, Conference Program & Exhibition $195

☐ Two-day Executive Microcomputer Workshop $595

☐ Complete Three Day Package, tutorial (check one), exhibits & full conference registration $440

☐ "In Depth" Tutorials $195
Wednesday, October 5, 9:00-5:30 (select one only)

☐ How to Select a Business/Personal Computer (T1)
☐ Microcomputers and Local Networks (T2)
☐ UNIX Tutorial for Managers (T3)
☐ Business Graphics for Managers (T4)
(In Depth tutorials will be held at the R.M.S. Queen Mary, Long Beach, California).

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- Registrations cancelled later than September 28 are subject to a $50.00 service charge. Registration may be transferred at no charge.

CWTS

Steel Mill Keeps Up to Date With Page System



U.S. Steel's plant in Lorain, Ohio

(Continued from SR/42)

pact printers and realized that as much as one third of the paper was wasted. "We would run the reports on four-part paper during the day and on six-part paper at night," he said.

"Sometimes we needed more copies of each report and other times fewer copies. The end result," he said, "was that we simply were wasting a lot of paper, and also had to decide who got the clearer first copies of the report and who had to settle for the poorer quality copies. We knew there had to be a better way to print and distribute these documents," he said.

The better way Pasciak was looking for turned out to be Honeywell, Inc.'s high-speed, nonimpact Page Processing System (PPS II). Pasciak's study confirmed that with the PPS II, Lorain Works would save about $13,000 per year on paper costs and could also eliminate one of its impact printers.

"That was all the cost-justification management needed to approve the PPS II acquisition," Pasciak said. "The other benefits of the Honeywell system are gravy."

Lorain Works' PPS II prints at 8,000 line/min and accepts tape output directly from Pasciak's mainframe computers. A Honeywell minicomputer is part of the PPS II.

"Data for our daily reports is entered on our mainframe system and is copied onto tape," Pasciak said. "The tape is mounted on the PPS II's tape drive where it is copied onto disk for output to the nonimpact printer. In this way, all information about report generation and distribution, including numbers of copies per report, is computer-controlled according to U.S. Steel's standards.

"The PPS II has the ability to run unattended for 30 to 40 minutes. The serial collate feature allows us to load up the disk, walk away and check back in 30 to 40 minutes, the time it takes to fill up eight pockets holding 4,000 pages," he added.

In addition to faster speed, the Honeywell system has made other contributions to Pasciak's department. "The impact printers used the normal tractor-fed oversized computer printout paper, which was awkward to read, handle and file, as well as being generally low in print quality," he said.

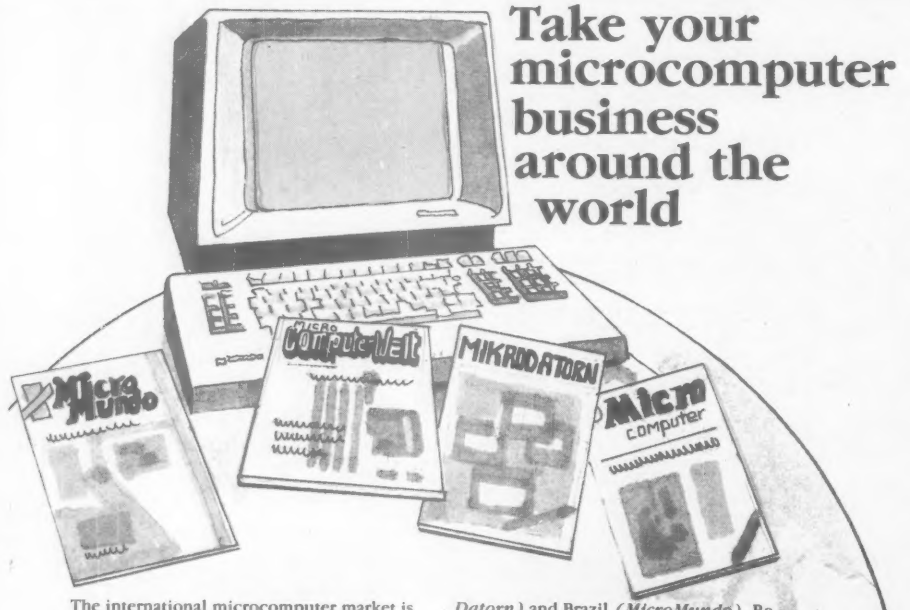
"With the PPS II, we've standardized on regular 8½-in. by 11-in. paper for convenience and, since every copy is an original, the print quality is identical for the first and last name on each report's distribution list."

Pasciak estimates that his PPS II prints just under 1 million pages per month in terms of daily reports and other documents; the printer can be made to run more than twice as fast if output volume demands.

Also available are automatic hole punching, vertical or horizontal perforating and designing custom forms and fonts interactively using the PPS II's integrated computer.



An output tray of Honeywell's Page Processing System at U.S. Steel's Lorain Works



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The international microcomputer market is booming. An annual growth rate of 40% is forecast through the end of the 1980's. Countries that are recognizing the need to computerize their governments, industries, and universities are looking to low-cost micro computers, thus creating worldwide opportunities. Microcomputers are affordable, adaptable and efficient. And the supply cannot satisfy the demand.

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For more information on our international micro coverage, call Diana La Muraglia, Manager, International Marketing Services *toll-free* 800-343-6474 (in Mass. 617-879-0700) or return the coupon below.

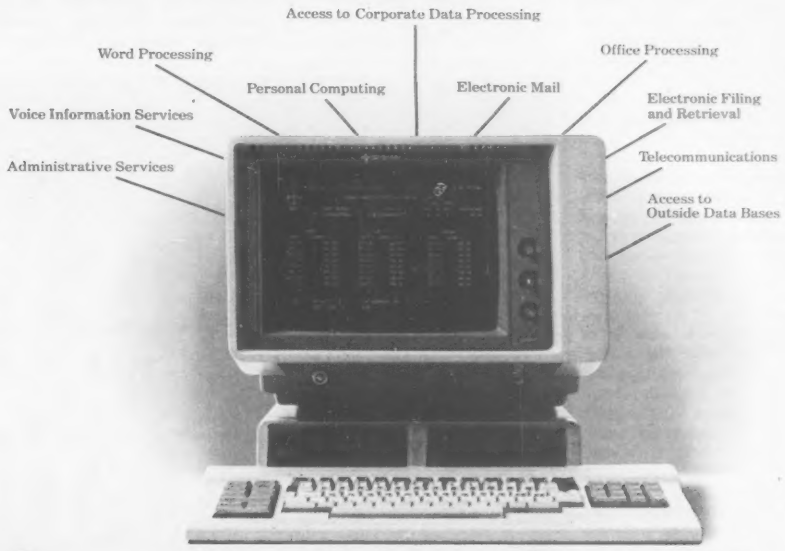
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We understand how important it is to listen.

SPERRY

Corporate DP Staff Equally as Happy

Users Win Independence With Micro Revolution

By Martin A. Snow
Special to CW‡

"Free at last," cry data processing users at the coming of the personal computer revolution. For them, the early years of data processing development have been filled with abusive delays, ineffective communications with management information systems (MIS) and a score of other annoying and unnecessary roadblocks to data systems development.

Increasing levels of analyst positions have now become a necessary means of translating the knowledge of separate groups of workers (who should not have become separate in the first place).

The current invasion of personal computing power has now provided organizations' users with the long-sought independence with which to meet their needs without the help of centralized DP departments — or so they think.

Further, this attitude is by no means restricted to the users. DP managers and their staffs couldn't be happier to emancipate the users. Why should they worry about the detailed development and control of applications programming if the users are content with their newfound personal computer self-reliance?

Should Be Confronted

These attitudes illustrate a DP trend that should be recognized and confronted before it is allowed to evolve into a serious problem for the coming transition to fully integrated personal computing. The ever-climbing demand curve for personal computers has created an organizational leap-before-you-look attitude toward the purchase and implementation of personal computers.

This approach to personal computing should not be perpetuated. Users, DPers and management must address the long-range issues of this transition and plan accordingly.

• Literacy — Personal computers have single-handedly raised the consciousness of the American public in regard to computing concepts. Professionals who have spent years sidestepping an understanding of what DPers were trying to explain are now comparing their bits-and-bytes expertise with any other user who will listen to their boasts of familiarity with high-technology issues.

• Diversity — The independence to develop specific computing systems to address small-scale user needs has begun to create a diverse data processing environment in many organizations. This diversity will be DP's nature, provided there is a stimulus for further creativity and more elegant solutions to functional system design. However, the maintenance of adequate control and coordination for such diverse systems will present increasingly complex challenges to tomorrow's management.

• Networking — The imminent availability of cost-effective networking software ensures the eventual system compatibility of all organizationally related personal computers. These future networks will allow users to share effectively data, software, storage and even CPU resources. The evolution toward networking holds the exciting promise of combining the advantages of a mainframe network with the diversity of workstations.

(Continued on SR/50)

THIS WEEK
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Marketing for Micros Different From Minis

By William G. Moore
Special to CW‡

Not too long ago, clear distinctions between microcomputers and minicomputers could be seen in word length, cycle time, memory size and disk capacity. However, recent technical advances have just about erased these boundaries.

The difference between the two now is almost entirely subjective and has to do with the way computers are marketed rather than how they were designed.

Micros are commodity products that perform specific functions dictated by the mass market for which they are intended. Minis are small (as opposed to mainframes), general-purpose computers that can be adapted to meet the requirements of a particular user.

While a microprocessor-based system can be configured to do almost anything a mini can, the marketing environment that created and sustains the "personal computer explosion" will never let that happen on a large scale.

Availability and support of comprehensive vertical applications for micros are limited now and will always be limited because necessary distribution channels cannot exist in that marketplace as it has evolved.

Micros are inexpensive and perform a host of useful functions that appeal to experienced users as well as to first-time users.

Introductory-level documentation, nonintimidating showrooms, attractive software presentations and retail sales techniques all combine to make microcomputers especially visible and attractive.

Software is cheap, too. The micro software market has moved away from the "hackers" who got it started to commodity publishers who package a well-written program with good documentation, wrap it all in cellophane and move thousands over retail shelves like candy bars. That's why it's cheap.

Constrains Products

But mass-sale marketing also constrains the types of products that can be offered to those that have a general appeal to almost all computer users. Word processors, spreadsheets and data manipulators will find a place in almost any business, so these are the kinds of programs that get published.

An inventory management system for wholesale distributors has a limited market that does not fit the merchandising pattern as it has been established for microcomputer products and will, therefore, be hard to find.

Of course, there are general ledger, payroll and other financial packages for micros, but all of them are "vanilla" and require that the business adapt to the computer — not the opposite.

Quality application packages certainly exist for micros, but commodity-oriented retailers don't depend on them for their existence. They can't spend the time it takes to learn about a specialized application, and considerations within their own business actually discourage the practice.

Pricing competition has compressed margins to the point where they no longer sustain the research and technical expertise needed to sell and support this kind of software.

Retailers cannot afford to spend more than a few minutes of a sales clerk's time on a sale, and they need to do it in a very structured manner. This will be apparent to a prospective user who shops carefully.

The micro retailer will probably be able to demonstrate and compare a variety

(Continued on SR/51)

ULTRA

ULTRA INTERACTIVE DATA BASE SYSTEM™ is our new relational, totally integrated data base system that takes full advantage of the interactive DEC™ VAX™ super minicomputer environment. ULTRA's release this week follows more than five years of research, development and testing. We believe ULTRA may well be the most revolutionary advancement in the minicomputer industry since the VAX itself.

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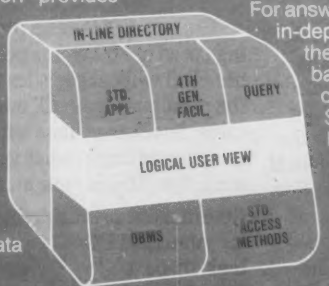
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Users Win Freedom With Micro Revolution

(Continued from SR/48)

• Control — As the speed and transaction volume of processing capabilities reach new heights, the need for comprehensive control mechanisms within those systems increases. DPers must be confident in the reliability of reporting systems to produce data.

• Credibility — Do managers still apply some unconscious degree of reliability to computer-printed reports only because they have that computerized (therefore correct) look? If so, the sudden proliferation of personal computer printers may be giving a degree of undeserved weight to an avalanche of computer-printed, but still mediocre, data.

• Security — How does the organization protect this expensive portable equipment? Should users be allowed to take personal computers home as they wish?

• Computerphobia vs. Tech Fever — With the zeal of old-time religion, every manager now feels that he must have a personal computer. This dash toward personal automation is creating a vast amount of uncoordinated and inefficient information development efforts. How can organizations improve these efforts without putting a damper on the enthusiasm of this new generation of involved users?

The key issue in today's trend to integrate personal computers into the work place is the question of centralized data control vs. decentralized authority.

Personal computer power is providing an enthusiastic stimulant for all MIS users. However, if these benefits are to be effectively integrated, corporations must anticipate the long-term issues and establish a structure in which the growth and development of personal computer utilization will be as productive as possible.

In order to meet the challenges of the current trend toward user-controlled diversification, managers must establish a firm commitment to the centralization of data resources. This long-term strategy will benefit many of the critical corporate issues in the years to come. These issues affect such areas as data control, data development, reporting sophistication, shared resources, security and many others.

Also, as networking technologies are advanced, the commitment to centralization will become more and more feasible. The resulting centrally controlled, user-developed personal computer networks will mark the completion of the first important stage of MIS/personal computer evolution.

Firms must not allow today's rush for personal computer independence to take them too far from a working environment that will be conducive to the eventual return to centralization.

An outline of some of the necessary topics that should be addressed in a typical personal computer utilization development policy follows:

• Steering committees.

• Purchase coordination and approvals (hardware and software).

• Application program documentation.

• Software libraries.

• Training and internal seminars.

• Communications (newsletters, for example).

• Security and back up guidelines.

It is interesting to see that many of these issues are now being recognized with the newly developed concept of the information center. With hope, organizations that cannot yet make a commitment to that specific strategy will recognize the need to establish the guidelines noted above in order to tame the effects of this personal computer revolution before the first casualties occur.

SPINWRITER INTR

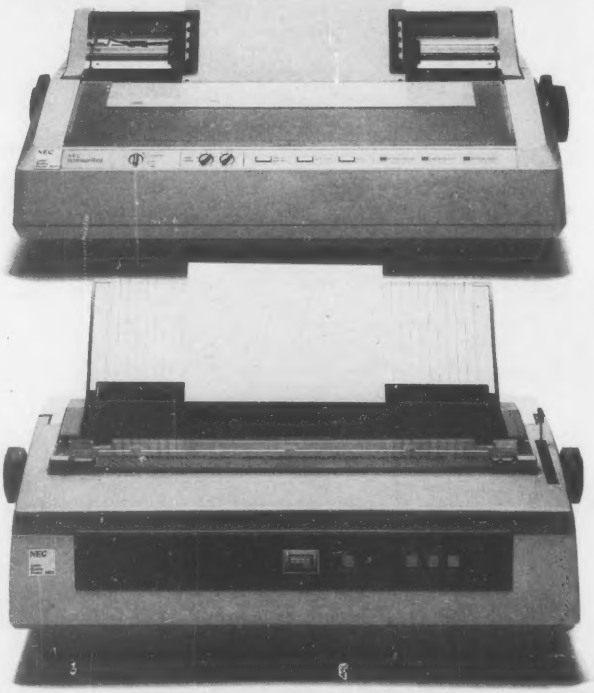
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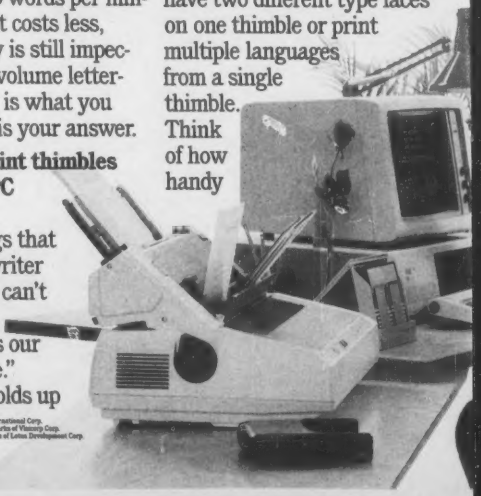


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Microcomputers Are Commodity Products

(Continued from SR/49)

of word processors, spreadsheets and other general products, but will have little information to offer about specific applications.

It would be silly for anyone to go out and buy a computer just because it's a micro or a mini. There is no general category of things a mini can do that a micro can't (or vice versa) because functionality within the capabilities of the hardware is a matter of implementation and programming.

A computer is used in business to solve problems and do specific work. A particular product either meets the requirements or it doesn't. A novice cannot perform this kind of evaluation without professional assistance, and few neighborhood computer stores are able to provide the right kind of help.

This is not to say that people who work in computer stores aren't professionals, because most of them are; but the profession they represent is retailing, not computer science.

The microcomputer explosion has created a new class of first-time users, while also creating a new class of first-time computer vendors. Many users would be much better off with a more powerful mini, but they don't know that and neither do their dealers.

All too often, neither the buyer nor the seller has any knowledge of computer technology and how it can be applied to solve business problems. Yet between them, they select and install thousands of systems every month.

Microcomputers are visible because of the way they are marketed — the software is impressive; the sales presentation is dazzling; and the price is right. All this generates billions of dollars in sales every year, not because of any quality inherent in the fact that these products contain microprocessors, but because they can be packaged and sold as "commodity computers."

Commodity Concept

Manufacturers, retailers and software publishers in this new business can't pursue the vertical applications market because they don't fit the mass merchandising, "commodity computer" concept, but independent sales organizations are discovering that it offers them an outstanding opportunity.

They can configure hardware to rival the performance of a powerful mini, couple it with their own specialized applications package and be competitive in almost any vertical market. But the mini vendors ought to prevail in this kind of competition.

Pricing tracks performance more than processor implementation so that microcomputer systems configured to perform the same as minis will likely cost the same also.

Minicomputer vendors have the edge once the price issue is settled, because they're usually backed by large national organizations that are not devoting their best resources to merchandising a retail product for mass consumption.

Repair and support services, training, software distribution and skill in the application of computer technology to business needs are all areas where they can excel.

System-level software for minicomputers is generally superior to that available for micros and probably always will be. The mass-market requirement will tend to retard development of sophisticated multiuser operating systems and telecommunications packages for micros.

Moore is manager of large systems planning at Honeywell, Inc.

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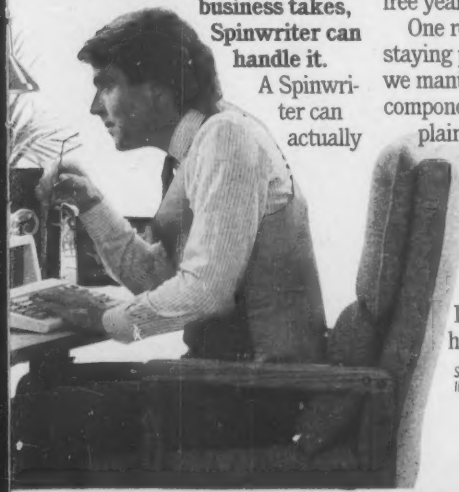
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Health Firm's Ills Lead to Info Center Cure

LOS ANGELES — Faced with an increasing volume of requests for on-demand reports, Kaiser Permanente, a nationwide provider of health care services, decided to give the information center concept a try at its Southern California regional headquarters here.

Kaiser Permanente's version of the information center, called the User Development Application Center (Udac), was implemented a little over two years ago using Answer/DB, an on-line report writer from Informatics General Corp., as the primary tool for on-demand report generation. Since then, a wide range of company personnel has learned to use the center's resources to produce their own reports, according to Diana Turner, supervisor of Udac's user consultant area.

Turner said Udac was established as a response to pressures from users. "We did not have the manpower within ISD [information services department] to respond to their ad hoc report requests in a timely manner, so we created Udac to free our programmers to do planned development work," she said.

"We've found that as many as three-fourths of the ad hoc requests can be satisfied by the users themselves," she said. "Our programmers in ISD appreciate being relieved of this on-demand report work load. The user is more than glad to take over the task and to learn how to get the reports he wants as soon as he wants them."

Turner emphasized that security of files and data bases is a prime consideration. "We control all the user file allocations, for example, and decide when they'll run and for how long," she said. "Users are required to stay within a controlling program — the system prevents them from exiting from it and performing unauthorized tasks. We also limit the size of their report files so that if they happen to make a mistake, there is only so much output they can produce. We try to make it extremely difficult for the users to interfere with normal production work loads."

Kaiser Permanente's Southern California regional headquarters serves eight medical centers, each with a major clinic and approximately 30 small clinics. Hardware at the headquarters here includes IBM 3033U and 3033N mainframes running OS/MVS with Vtam. Terminals include IBM 3276s and 3278s and several types of dial-up terminals.

The primary objective of Udac is to enable both ISD and non-ISD personnel to have appropriate levels of direct access to ISD resources. As a secondary

(Continued on Page 66)

Runs on IBM 370, Compatibles

Unicalc Unwraps Spreadsheet Package

WAYNE, Pa. — Unicalc Corp. has announced an electronic spreadsheet package that features a general-purpose interface capability to data base management system (DBMS) files on the IBM mainframe.

The Unicalc/DB package is designed for use with any IBM or compatible system that uses an IBM 370 architecture, including the IBM 370, 4300 and 30 series and plug-compatible mainframes. The package runs under most IBM operating systems, including VM, DOS/VSE or MVS and teleprocessing monitors, a spokesman said.

The package offers multisheet addressing and employs syntax and commands similar to Visicorp's Visicalc. Data can be entered into the Unicalc/DB spreadsheet with a standard IBM 3270 terminal or with a compatible device. Users can address rows and columns by coordinate or by logical names and can manipulate screens to view any part of the work sheet.

File structures that can be accessed by the package include IBM's DL/1, IMS and Vsam; Cullinet Software, Inc.'s IDMS; Software AG of North America, Inc.'s Adabas; Cincom Systems, Inc.'s Total; and Applied Data Research, Inc.'s Datacom/DB. Users can determine where on the spreadsheet data will be written from the DBMS, the spokesman claimed.

Users can invoke mathematical functions such as net present value and define new functions that may be used in other formulas. The package is enhanced with a series of utilities which allows the DP department to allocate the system resources that any department, user or sheet may be given, the spokesman said. A librarian program designed to archive automatically or restore users' sheets is also available.

The Unicalc/DB is available for $19,500 on a CPU license from Unicalc, Two Academy Lane, Wayne, Pa. 19087.

IBM DOS/VSE Update Improves Display Request Response Time

MINNEAPOLIS — B.I. Moyle Associates, Inc. has announced an enhancement for IBM's DOS/VSE power spooling system that improves response time to queue display requests.

The BIM-Power Dynamic Queue (PDQ) package retains a copy of the Power queue file in virtual memory and can satisfy queue display requests without performing any disk I/O, a spokesman said. Performance is improved through nearly instantaneous response to queue display requests and in reduced disk unit and channel contention.

Queue accesses from other software, such as most on-line program editors or terminal printer spooling systems, are also intercepted by BIM-PDQ, the spokesman said.

An optional feature automatically deletes jobs left in the Power queue longer than a user-specified time limit. This feature also improves Power queue access performance by eliminating the need to read over inactive entries.

The package is base priced at $2,000. B.I. Moyle Associates is located at 5788 Lincoln Drive, Minneapolis, Minn. 55436.



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QCM Performance Monitor Gets Two Enhancements

PITTSBURGH, Pa. — Duquesne Systems, Inc. has released two new enhancements for the event-driven Quantitative Computer Management (QCM) performance monitor for IBM's MVS operating system.

The Task Measurement Facility reportedly allows users to obtain QCM measurements at the task level within an address space, rather than at the total address space level, which is useful in tuning subsystems.

The Operation Code Analyzer produces reports showing the systemwide frequency of use of various machine operation codes.

The QCM performance monitor with its two enhancements costs $14,000 from Duquesne Systems, Two Allegheny Center, Pittsburgh, Pa. 15212.

MCBA Updates 'Report Writer'

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced Release 2 of its Report Writer package for Digital Equipment Corp. PDP-11s with the RSTS/E operating system.

The Dibol package is said to interface with all other MCBA packages in addition to non-MCBA files, including sequential files with no control record and Dibol Isam files.

The report writer is table driven and parameter driven with no source code generated. Data files are opened in the input mode so that data integrity is reportedly not threatened.

A source code license for the RSTS/E Report Writer, which comes with a software reference manual and a user's manual, is $2,000 for use on the first computer.

Mini-Computer Business Applications is located at 2441 Honolulu Ave., Montrose, Calif. 91020.

Text Editor Out For VAX Users

CAMBRIDGE, Mass. — Computer Corp. of America has unveiled a text editor for Digital Equipment Corp.'s VAX-11 hardware running on UCB Unix or DEC VMS operating codes.

Dubbed Emacs, the new software package is intended to be used for programming, as part of decision-support systems or for large-scale text processing, the vendor said.

Prices range from $350 to $850 from Computer Corp. of America, which is located at Four Cambridge Center, Cambridge, Mass. 02142.

ADP Network Develops Project Management System

ANN ARBOR, Mich. — ADP Network Services has announced the development of an integrated project management system for computers ranging from mainframes through micros.

The Apecs/8000 was designed to include a range of information capabilities with multiple delivery mechanisms to accommodate projects of varying sizes.

According to the vendor, the system starts with a management objective that is typically too complex to manage, breaks it down into components and then consolidates the detailed data.

The Apecs/8000 is based on a relational data base management system providing a collection of data that is then drawn upon for calculations, reports and graphs. It includes earned-value analysis, application building techniques and a range of graphics and writing capabilities.

The system will be available in November for 16-bit micro computers and early in 1984 for other 32-bit mid-range and mainframe computers, including those from IBM and Digital Equipment Corp.'s VAX-11.

Prices, including hardware, range from $2,000/mo to $9,000/mo from ADP Network Services, which is located at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

Info Center Handles Reports

(Continued from Page 65)

objective, the center participates and assists in developing and implementing short-term computer applications.

A third objective of Udac is to help make ISD resources and consulting services available to independent user developers within the company, Turner said. For example, Udac personnel will provide assistance to users in developing Cobol applications and in the use of Informatics' Mark IV implementation system for batch applications.

Each of the software tools is used for a specific user need. Answer/DB is used for simplified language oriented toward end users with minimal computer training and experience, she said. Mark IV is an implementation tool used by more sophisticated users for batch system design, implementation and updating.

"Education for the end user is one of our most important activities in Udac," she said. "Typically, we provide them with three courses: an introduction to data processing, an introduction to data communications and how to use Answer/DB.

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Data Base Tool Targets DPers In DL/1 Shops

PLYMOUTH, Minn. — A data base tool said to improve productivity of data base administrators and applications programmers in IBM DL/1 data base environments has been announced by MBI Systems, Inc.

The On-line Program Specification Block Inquiry and Edit (Opie) product reportedly provides immediate access to current program specification block information and edits the program specification block against the data base description from any CICS terminal.

The vendor said Opie eliminates the need to maintain and refer to printed listings in order to determine current specification block status. Programmers using the product need not check with data base administration to determine if a specification block is ready for use, a spokesman said.

The product is available for $1,000 from MBI Systems, 3030 Harbor Lane, Plymouth, Minn. 55441.

'Dash' Version Offered, Runs On DEC VAX-11

LITTLETON, Colo. — Interactive Systems Corp. has announced Version 2.0 of its Drawing Access and Storage Handler (Dash) two-dimensional computer-aided design and drafting software package.

Dash can be installed on all members of Digital Equipment Corp.'s VAX-11 family of minicomputers operating under the VMS operating system, a spokesman said.

Improvements reportedly include options of running a black-and-white terminal or a color terminal with a palette of seven colors. The package supports multiple users, offers system security and provides data base sharing, the vendor said.

The system reportedly conforms to U.S. Department of Defense and National Aeronautics and Space Administration drawing specifications and is available for $20,000 from Interactive Systems, 5500 S. Sycamore St., Littleton, Colo. 80120.

Package Debuts For Distributors

KENNEWICK, Wash. — An industrial wholesaler distribution package that runs on Datapoint Corp. hardware has been announced by the Kennewick Industrial & Electrical Supply Co., Inc.

The vendor said the package will handle most functions of the distribution business on both retail and wholesale levels.

The package reportedly contains full accounting software, including general ledger, accounts payable, accounts receivable, operations control and financial and sales analyses.

The package is priced from $65,000 from Kennewick Industrial, 113 E. Columbia Drive, Kennewick, Wash. 99336.

To DEC Professional Series

Package Provides 3270 Emulation

HOBOKEN, N.J. — A package providing IBM 3270 protocol emulation to Digital Equipment Corp.'s Professional 300 series of personal computers has been announced by Advanced Systems Concepts, Inc. (Asci).

Professional Intersystem Management (Prism) runs under DEC's P/OS operating system, Versions 1.5 and 1.7, emulating an IBM 3276 controller with up to four communications paths, according to Asci.

Additionally, Asci announced the Remote Printer Sub-System, RP32, a package enabling users of DEC's VAX computers to designate printers on remote computer systems.

The vendor said Prism has two facilities: virtual terminal emulation, which causes the Professional's keyboard and display to appear as an IBM 3278 Model 2 display station and the printer to appear as an IBM 3278 printer; and intersystem task facility, which allows a program on the Professional to communicate with a program on the IBM system.

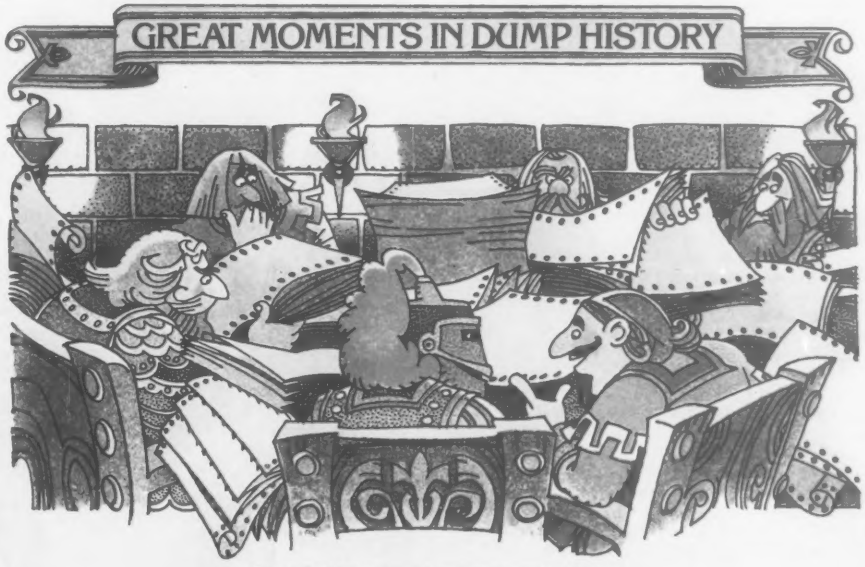
Prism is available for $595; RP32 is priced at $900 for host software and $200 for listener software from 22 Hudson Place, Hoboken, N.J. 07030.

Automated Aids Out for Method/1

CHICAGO — Arthur Andersen & Co. has announced the release of two automated aids designed to simplify project management tasks for users of Method/1, its information systems development methodology. The software was designed for IBM's Personal Computer.

Estimate/1 automates the project estimating process using a series of Visicorp.'s Visicalc templates. Track/1 is a time reporting and project control system that allows managers to set up and maintain programs.

The aids sell for $1,000 from 69 W. Washington St., Chicago, Ill. 60602.



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IMS Introduces On-Line Tool For System/38

MARINA DEL REY, Calif. — International Management Systems Corp. (IMS) has introduced a new on-line accounts receivable system for the IBM System/38.

The package maintains information on a company's receivables and provides users with credit management tools, such as daily aging and unlimited comments section, a spokesman said.

Cash receipts can be applied against specific open items or balance due, and accounts are automatically adjusted by cash discounts and write-offs, according to the vendor spokesman.

The system is available for a license fee that ranges from $8,500 to $13,500 from IMS, located at 4676 Admiralty Way, Marina Del Rey, Calif. 90291.

Ansi X3 Group Votes to Include Fortran Interface

WASHINGTON, D.C. — The American National Standards Institute's (Ansi) X3 technical committee on computer graphics has voted to include complete programming language interface descriptions as part of the draft-proposed American National Standard Graphical Kernel Systems. A subroutine interface specification for ANS Fortran will be the first such language interface.

In other standards action, the information processing technical committee of the International Standards Organization has begun work on an Ansi proposal for a Virtual Device Metafile (VDM) standard for computer graphics. The VDM provides a standardized method of storing graphics images from later processing and of exchanging images between graphics systems.

Both the Fortran interface and the VDM proposals will be presented for review this fall.

'Insurmite' Out For IBM Minis

ALAMEDA, Calif. — Administrative Data Corp. (ADM) has introduced Insurmite, an agency/brokerage administrative system for IBM System/23 and System/36 minicomputers.

All informational screens have alpha name search options. Other features include a general ledger for multibranches which supports cash or accrual accounting, optional claims and policy service modules and payables with an optional check writer which is run on demand with work sheets for account current or item payables.

The product, which includes IBM hardware, starts at $14,000 and is expandable up to 30 workstations, the vendor said.

Additional information is available from ADC, 512 Westline Drive, Alameda, Calif. 94501.

SPSS-X Gets 'Userproc' Facility Upgrade

CHICAGO — Users of SPSS, Inc.'s SPSS-X information analysis systems can add customized procedures or stand-alone programs to their systems with the SPSS's Userproc facility upgrade.

Userproc allows end users to tailor computing tools or add Fortran or Cobol programs. These user-defined programs become procedures of SPSS-X, with the ability to read data, retrieve data labels, check for missing values and print error messages.

Userproc comes with a subroutine library containing necessary service facilities and many statistical subroutines to interface with stand-alone programs, a spokesman said. In addition to Userproc, Release 2 of SPSS-X includes a data cleaning facility and enhanced report writer.

SPSS-X currently runs on IBM CMS and CS and on Digital Equipment Corp. VAX-11 systems. The Userproc enhancement is available free of charge to current SPSS-X users. Annual license fees begin at $4,000 from the company at 444 N. Michigan Ave., Chicago, Ill. 6061l.

IBM Micro Link Unveiled

LAWRENCE, Mass. — Genesys Software Systems, Inc. has announced an IBM Personal Computer integration capability for its Human Resource Management Software (HRMS) for IBM mainframes.

Genesys users can select data from the mainframe pavroll, personnel or deferred benefits data base and download it to the Personal Computer with a single keystroke, a spokesman said. The link operates as a module of Genesys' on-line All-Screen system and is fully compatible with Genesys' Telecommunications and Information/Decision System.

The facility is available at no additional cost to users. The HRMS system has four different modules. Payroll costs $42,000; personnel costs $54,000; benefits costs $59,000 if integrated with payroll and personnel; $110,000 stand-alone. All-Screen costs $35,000. Prices include unlimited support from Genesys at 10 Grafton St., Lawrence, Mass. 01843.



Why buy two personal computers when you can get four workstations and a real business computer for less?

Batch Contouring System Receives Enhancements

AUSTIN, Texas — Radian Corp. has announced a series of enhancements to its Interactive Contour Plotting System (CPS)-1/G batch contouring system.

The enhancements provide real-time multiple surface operations; the capability to contour directly up to faults; screen to hard-copy output at any time during processing; control-point input from external files; orthogonal contouring; and an enhanced file management system, a spokesman said.

Available for use on a variety of computers and output devices for interactive contour map creation, analysis and editing, CPS-1/G is priced at $28,000 in the U.S. and $36,000 overseas. More information is available from Radian Corp., 8501 Mo-Pac Blvd., P.O. Box 9948, Austin, Texas 78766.

Info '83 Giveaway Announced

BOSTON — Integrated Planning, Inc. has announced that it will sponsor a contest at the October Info '83 trade show in New York. The winning firm will receive a free copy of the Stratagem decision support system, which licenses for $85,000.

Contestants must determine how much is in the Stratagem Money Bowl located at the Integrated Planning booth.

Entries must be submitted on behalf of a company. The company may not be in the business of developing or selling software for third parties and must have access to a system suitable for running Stratagem. All entries must be received by 2 p.m. on October 13. The winner will be announced at 3:30 p.m. the same day.

Loan System Fits Series/1

PALO ALTO, Calif. — Remote Computing Corp. has announced a Loan Origination and Tracking System designed for use with an IBM Series/1 minicomputer using Pick and Associates, Inc.'s Pick operating system.

Features include loan tracking from application through closing, immediate on-line inquiry, sales commitment tracking, automated document preparation and custom reports.

Standard reports include an application register and reports for savings and loans, status reports by origination location, producer and processor, and funded loans and canceled applications by date.

The cost for the Loan Origination and Tracking System is $17,000 from Remote Computing at 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

Data Base Service Out for Analysts Using IBM Micro

ANN ARBOR, Mich. — ADP Network Services, Inc. recently announced a data bank service for business analysts and forecasters using IBM Personal Computers.

The Datapath service provides access to data bases with information on 8,500 industrial corporations, 14,000 commercial banks, 4,000 savings and loan institutions and more than 90,000 securities, a spokesman said. Also available on the service are quarterly financial statements for reporting companies, weekly stock market quotes and forecasts by Townsend-Greenspan & Co., Inc.

Users may call information to their own format and report structures, or they may utilize ADP's Applications Library. The company said that the library will provide analytical frameworks for use with Lotus Development Corp.'s Lotus 1-2-3 integrated software package.

The price of the vendor's Datapac software is $235/copy, or it may be purchased with the Lotus package for a total of $690. Monthly fees are based on transactions, with an account minimum of $100/month. More information is available from ADP Network Services, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

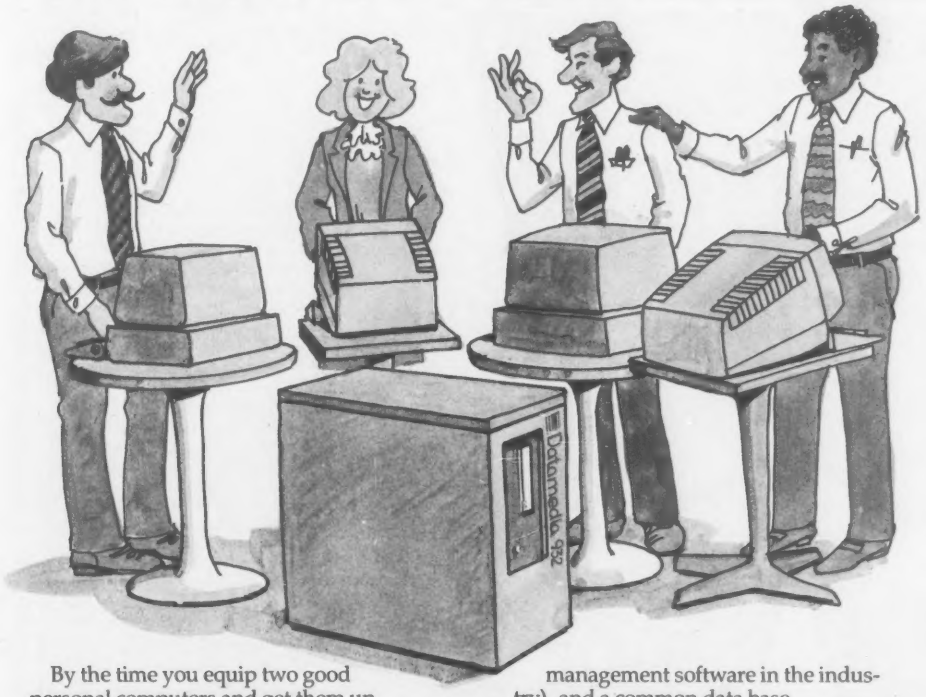
ATM Unveils Revision 5 Of 'Monitor'

HOUSTON — ATM Computing Services has announced Revision 5 of Monitor, a performance measurement package for Prime Computer, Inc. computers, expanded to run on Primos Revision 18 and 19 and Prime Information operating systems.

Monitor aids in identifying specific user-related problems, which may be corrected by rescheduling the work load or by system reconfigurations. In those cases where additional hardware will improve the performance, Monitor aids in selecting the hardware, the vendor said.

The following new reports are available as options: CPU vs. paging, disk vs. paging, disk vs. buffering, disk access time in msecs and sampling time in msecs.

The price is $2,250, which includes maintenance for the first year, from ATM, P.O. Box 1885, Houston, Texas 77001.



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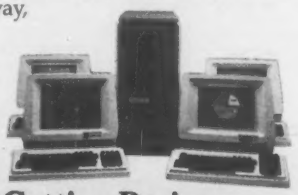
If you've already installed some personal computers, you can get a much bigger return on your investment by using them as workstations on our Datamedia 932. They can still handle personal computing tasks whenever you wish, but the 932 will let them get down to business the rest of the time.

Up to 16 people can simultaneously share the 932's powerful, 32-bit central processing unit, its interactive operating system (featuring the most powerful relational data base management software in the industry), and a common data base.

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Find out more about the Datamedia 932 System, and the location of the authorized Datamedia dealer nearest you. Call 1-800-DMC-CORP. (In New Jersey, call 1-609-665-5400.) Or write Datamedia Corporation, 7401 Central Highway, Pennsauken, NJ 08109.



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Release 5.0 of 'Abstract/38'

Data Base Reporter Updated

CHICAGO — Advanced Systems Concepts, Inc. has announced Release 5.0 of Abstract/38, a data base reporter for the IBM System/38. The system includes program and data base reporting. Program-level documentation includes program flow charts, procedure explosion reports and source code listings.

The new release performs control language analysis at the object level instead of at the source-code level, the vendor said.

Abstract/38 allows data base information to be reported for both external file descriptions and internally described RPG program descriptions.

A one-time license fee is $1,000, and the product is available for a two-week trial inspection. Further information is available by contacting the vendor at 1084 Cornell, Wheeling, Ill. 60090.

'Impact' Aids Reinsurers

ORANGE, Calif. — Insurance Technology Consultants has announced the Interactive Management Pricing Aid for Catastrophe Treaties (Impact), an RM-Cobol-based product currently running under Unix and Microsoft, Inc. MS-DOS operating systems.

Impact is an aid for reinsurance brokers or lead underwriters charged with the pricing of catastrophe treaties. Given the base-year written premium, policyholder surplus and estimated premium income for the coming year and by varying the limits, retention, primary layer and premium rate, this product calculates the subject premium, payback in years, company retention expressed as percentage of estimated premium and policyholder surplus and cost of catastrophe coverage per thousand dollars of coverage, the vendor said.

A license costs $495 from Insurance Technology Consultants, Suite F, 1437 W. Palmyra, Orange, Calif. 92668.

HP Guide Out for IBM Micro

PALO ALTO, Calif. — Hewlett-Packard Co. is offering a new software guide designed to help the IBM Personal Computer user choose among 10 graphics software packages that produce high-quality charts and graphs on the HP 747OA graphics plotter.

The guide, Publication 5953-4169, also lists detailed information on connecting the HP 747OA to the IBM Personal Computer — including recommended system configuration — along with connection instructions and communication verification.

The publication can be obtained free of charge from local HP distributors or by contacting HP, which is located at 1820 Embarcadero Road, Palo Alto, Calif. 94303.



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Package Targets Canadian Payroll

MONTVALE, N.J. — Information Science, Inc. has announced a Canadian payroll processing feature for its payroll/personnel package for IBM's IMS and DL/1 and Software AG of North America, Inc.'s Adabas data base management systems. The package also runs under IBM's Vsam access method.

The Canadian payroll package is included as a no-charge option in the vendor's payroll/personnel packages. In addition, current users of the package who are subscribing to the vendor's maintenance program can get the Canadian payroll feature free, the vendor said.

The Canadian payroll package allows automated processing of various Canadian financial data including unemployement insurance, pension plans, the Quebec Pension Plan, federal and provincial taxes, nonpaid taxable benefits and vacation pay processing, the vendor said.

The vendor's payroll/personnel packages cost between $50,000 and $230,000, the firm said from 95 Chestnut Ridge Road, Montvale, N.J. 07645.

Mail, Filing System Runs Under RT-11

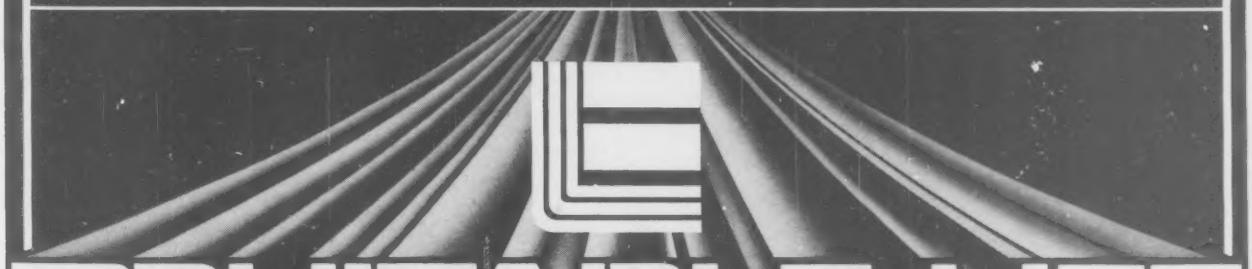
RICHMOND, Va. — Horizon Data Systems Co. has announced an electronic mail and filing system that runs under Digital Equipment Corp. RT-11 and S & H Software Computer Systems, Inc. TSX-Plus operating systems.

Quick-Mail supports a spectrum of applications including annotated file archives, tickler files, appointment calendars and electronic project notebooks, the vendor said.

The system is available for $650 from Horizon Data Systems, 1901 Wildflower Terrace, Richmond, Va. 23233.



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Micro Notes

Formatted File Manager is a data base management system for the IBM Personal Computer and Personal Computer XT. Electronic forms identify a function to be performed and data that must be entered and a form may be generated to allow access to a data base. As many as 175 fields may be defined per form. Priced at $225, the system runs on IBM's PC-DOS 1.1 with 128K bytes of memory and one double-sided, double-density disk drive or the Personal Computer XT with PC-DOS 2.0 and 192K bytes of memory. A $70 report/sort option is also available through Exim Services of N.A., Inc., P.O. Box 5417, Clinton, N.J. 08809.

Softword Systems, Inc. has introduced **Multimate**, a function-key-driven system for documentation creation and modification. The software can be used with IBM's Personal Computer and Microsoft, Inc. MS-DOS operating systems and requires at least 128K bytes of random-access memory and two diskette drives. The software costs $495 from 52 Oakland Ave. N., East Hartford, Conn. 06108.

Ellis Computing, Inc. has introduced **Nevada Fortran Revision 3.0** for Digital Research, Inc. CP/M operating systems. The compiler's features include chaining with name and blank common, IF-THEN-ELSE constructs, trace-style debugging, PEEK, POKE, 150 verbal error messages, arrays up to seven dimensions and random-access file support. The Fortran compiler generates Intel Corp. 8080 machine language. The software costs $29.95 from Ellis Computing at 3917 Noriega St., San Francisco, Calif. 94112.

The Rapidata Division of National Data Corp. (NDC) has introduced **Calc-Plus**, designed to increase the scope of Calc packages. Calc-Plus Service links users of Visicorp's Visicalc and Supercalc to the division's remote-access host computers permitting utilization of NDC's decision support software, network services and data communications capabilities, the vendor said. This service is available for Visicalc on IBM's Personal Computer and Apple Computer, Inc.'s Apple II+ and for Supercalc on the North Star Computers, Inc. Advantage computer. Prices are based on connect time, the vendor said through 20 New Dutch Lane, P.O. Box 1049, Fairfield, N.J. 07006.

Computer Tutor Corp. has announced a series of software-specific, self-teaching books with diskette for IBM's Personal Computer and Apple Computer, Inc.'s Apple II+ or IIe. Training courses in Lotus Development Corp.'s Lotus 1-2-3, Microsoft, Inc.'s Multiplan, Micropro International Corp.'s Wordstar and Visicorp's Visicalc and Supercalc are available. The price of each course is $39.95 from Computer Tutor at 554 Washington St., Wellesley, Mass. 02181.

Cimarron Corp. has announced the **Insta** line of productivity software for Commodore Business Machines, Inc.'s 64 personal computer. The series consists of nine packages, which include the Insta-Writer, Insta-Mail, Insta-Calc, Insta-Vestor, Insta-File, Insta-Sched, Insta-Check, Insta-Graph and Insta-Speed. Package prices range from $34.95 to $99.95 and are available from 2158 S. Hathaway St., Santa Ana, Calif. 92705.

Geocomp Corp. has introduced **Geograph**, a software package to help create plots and graphs commonly used in business, science or engineering. The software is reportedly available using Digital Research, Inc.'s CP/M operating systems for Hewlett-Packard Co., IBM and Watanabe Instruments Corp. pen plotters. The price is $250 from 342 Sudbury Road, Concord, Mass. 01742.

Burns & Associates has announced the **Version 8-System Activity Monitor** for Microdata Corp.'s Reality and Sequel systems. The package includes user billing routines and real-time reporting and system usage. The monitor package operates with systems using 3.X firmware and operates under Version 3 or 4 of the Reality operating systems. The software is available under a single processor license agreement for $450 through P.O. Box 451, Cincinnati, Ohio 45201.

Microq, Inc. has introduced **Finance 12Q**, a comprehensive financial software package for IBM's Personal Computer. The interface includes direct cursor positioning and data entry. It reportedly performs complex financial computations, including compound interests, cash flows and net present value. The price is $129.95 from 3843 Plaza Drive, Fairfax, Va. 22030.

Micro Architect, Inc. has introduced **Exec-I** for IBM's Personal Computer and Personal Computer XT with two drives, and IBM's PC-DOS and monochrome display. The package includes seven applications: mailing list system, letter/memo system, record/inventory, check management system, stock security system, personal finance and appointment management. Available in a 64K-byte interpreter version and a 128K-byte compiled version, the Exec-I costs $198 from 6 Great Pines Ave., Burlington, Mass. 01803.

Europro, Inc., has introduced **Edubas III**, a six-lesson program designed to teach the new features available in IBM's Basic 2.0. The programs require Microsoft, Inc.'s MS-DOS, or IBM's Personal Computer or PC-DOS-compatible operating system with at least one diskette drive, the color graphic adaptor and an 80-col. monochrome or color display. The price is $50 from 129 Saratoga, Petaluma, Calif. 94952.

Westminster Software, Inc. has introduced **Pertmaster**, a software package that reportedly lets users manage multiactivity projects using either the project evaluation and review technique or critical path analysis method. It is compatible with Digital Research, Inc.'s CP/M and MP/M, IBM's PC-DOS, and Microsoft, Inc.'s MS-DOS 64K-byte operating systems with rigid or floppy dual disk drives and printers with a line capacity of at least 132 characters. The price is $695, including documentation from Suite 245, Building 4, 3000 Sand Hill Road, Menlo Park, Calif. 94025.

Why Systems, Inc. has introduced **Pro/Digicalc**. The software is a virtual memory spreadsheet designed for Digital Equipment Corp.'s PRO/350. Features include an easy entry system for information retrieval, three-dimensional consolidation where a number of worksheets can be summed together into a single spreadsheet and multitasking ability. The price is $650 from 16902 Redmond Way, Redmond, Wash. 98052.

Graphwriter Communications, Inc. has introduced Version 3.1 of **Graphwriter**, a presentation graphics package for the IBM Personal Computer and Personal Computer XT. Support for the following three plotters is included: IBM's X/Y749; California Computer Product, Inc.'s Calcomp 84; and Enter Computer, Inc.'s Sweet-P. The price is $395 from 200 Fifth Ave., Waltham, Mass. 02254.

SLR Systems has announced the **Z80 Assembly Language Development** package for Zilog, Inc. Z80-based microcom-

(Continued on Page 74)

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Micro Notes

(Continued from Page 72)

puters utilizing Digital Research, Inc.'s CP/M operating system. The package consists of Z80 ASM, a relocating macro assembler and SLRNK, its companion linking loader. The price is $169.95 plus $30 for the manual from 1622 N. Main St., Butler, Pa. 16001.

Peachtree Software, Inc. has announced the release of a version of its **Business Graphics System** for the IBM Personal Computer and Zenith Data Systems, Inc.'s Z-100 microcomputers. Written in Peachtree Graphics Language, the software enables the user to design charts and graphs using input from the screen or from financial modeling packages such as Peachtree's Peachcalc and Visicorp's Visicalc and Supercalc. The system also supports Epson America, Inc.'s MX80 or MX100 printers, the IBM Personal Computer printer, Hewlett-Packard Co.'s 7220 and 7470 plotters, Bausch & Lomb Houston Instrument Division's DMP series plotters and Strobe, Inc.'s S-100 plotter. The price is $295 from 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

The Computer Company has announced the **APL.68000** interpreter for Altos Computer Systems, Inc.'s ACS68000 Models 12 and 14, Cyb System, Inc.'s Multibox models and Sord Computer Corp. of America's M68 PC model. The price is $2,000 each for the Altos and Cyb systems from 1905 Westmoreland St., Richmond, Va. 23230.

Silicon Valley Ststems, Inc. has introduced the **Handlers**, a word processor software package that includes the Word Handler and the List Handler for users of Apple Computer, Inc.'s Apple II, II+, IIe or Franklin Computer Corp.'s Ace computers. The Word Handler's major feature allows the user to see on-screen what the final printout will look like. The List Handler is a filing management program which has a storage capacity of up to 3,000 records on one disk. The Handlers package is priced at $89.95. The Word Handler costs $59.95 and the List Handler costs $49.95 from Suite 4, 1625 El Camino Real, Belmont, Calif. 94002.

Emerging Technology Consultants, Inc. has introduced **Offix**, an office document system for the IBM Personal Computer. The system integrates electronic filing functions, word processing, form design and report generation. The software requires Microsoft, Inc.'s MS-DOS operating system and costs $99 from 2031 Broadway, Boulder, Colo. 80302. This product will be available by the first quarter of 1984, the vendor said.

Taurus Software Corp. has announced the release of **CPplus V2.0** for users of IBM's Personal Computer. CPplus consists of a computer-aided instruction tutorial on the basic operations of a personal computer, an English-language front-end interface, and a package of file management utilities. The software is available for IBM PC-DOS, selected Microsoft, Inc. MS-DOS and selected Digital Research, Inc. CP/M 80 and CP/M 86 operating systems. The price for the 16-bit version is $200, and the 8-bit version is $150 from 3685 Mount Diablo Blvd., Lafayette, Calif. 94549.

Business & Professional Software, Inc. (BPS) has announced a new version of **Business Graphics** for the IBM Personal Computer and the Personal Computer XT.

The software adds new graphics features, which include new area fills, support for additional printer/plotter output devices and disk-based instruction tutorials, to the earlier BPS software.

Required hardware includes 128K bytes of main memory and, for the standard IBM Personal Computer, at least two double-sided disk drives.

Business Graphics costs $350 from 143 Binney St., Cambridge, Mass. 02142.

Data Processing Design has announced **Word-11**, a word processing system for users of the Professional 350 personal computer system from Digital Equipment Corp.

The software includes features to create, edit and print interactively a variety of documents ranging from letters and reports to contracts and technical manuals. Specialized printing functions such as overstrike, superscript, subscript, proportional spacing and use of multiple character sets are supported for most printer types.

It is available for $745, which includes list processing and spelling error detection, or for $595 without full-feature configuration from Suite F, 181 W. Orangethorpe, Placentia, Calif. 92670.

An integrated software package for the IBM Personal Computer XT equipped with 128K bytes of memory and hard disk capacity of 10M bytes or more, **Printing Software Management Package** reportedly provides small to medium graphics arts firms with the ability to do estimating, job costing, inventory control, job scheduling and other management functions. Prices start at $3,000 from Printers Software, Inc., 933 Rt. 23, Pompton Plains, N.J. 07444.

Televideo Systems, Inc. has announced **Telesolutions II**, a kit containing three software packages for both its TS 803 and TS 1603 personal computers. Containing word processing, spreadsheet and integrated software packages, the kits are priced at $795 for the TS 803 and $595 for the TS 1603. More information is available from 1170 Morse Ave., Sunnyvale, Calif. 94086.

A "Basic Algorithms" **Micro Chart** has been introduced by Micro Logic Corp. The two-sided 8½-in. by 11-in. plastic reference sheet has algorithms written in "minimal" Basic including four ways to sort. Each algorithm is accompanied by its function, advantages, speed and method.

The cards cost $5.95 each plus $1 total postage through P.O. Box 174, 100 Second St., Hackensack, N.J. 07602.

Software Fitness Program is a set of interactive accounting applications for single and multiple users of Victor Technologies, Inc.'s Victor 9000 personal computer operating under Microsoft Corp.'s MS-DOS. Including accounts receivable, accounts payable, general ledger, inventory, payroll and other applications, the package is being marketed through Victor 9000 distributors for a suggested list price of $695 per application by Open Systems, Inc., 430 Oak Grove, Minneapolis, Minn. 55403.

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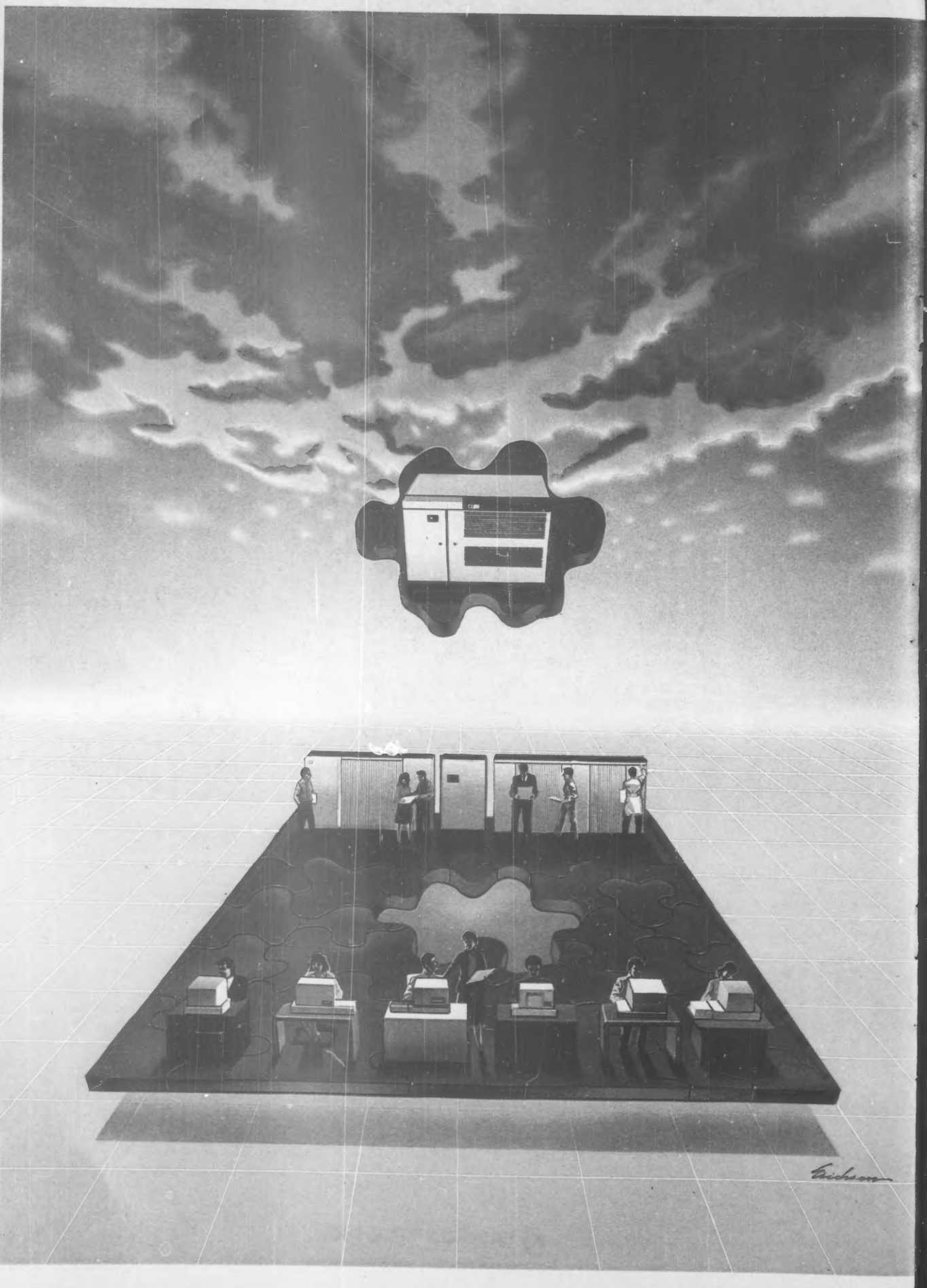
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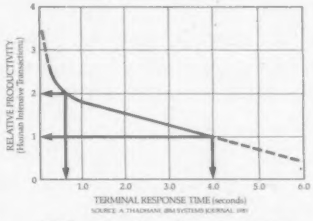
This lets you really manage your resources. And add capabilities you've been wanting. Without the drawbacks.

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The MidFrame provides consistent *subsecond* response time for about half the usual per-user cost. Think what this does for productivity! Development lead times and labor costs can shrink dramatically. Add to that the accelerated return on your applications investment and you've saved a tidy sum.

Or extend your mainframe's life.
If CPU capacity is a problem, the MidFrame offers an easy, economical alternative to costly upgrades. That's because you can offload up to 50 percent of your interactive program development workload to the MidFrame. And overall performance will improve as a result.



Boost productivity with powerful software tools.
The MidFrame provides capabilities never before found in mainframe shops. Things like knowledge-based editors that "know" just what to do. Without being told! And functions for compound searches. Undo/redo too. Plus a powerful, consistent command language that is easily expanded.



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You also get sophisticated window management—with multiple split screens—for simultaneous processing and tracking of multiple activities. There's even host-compatible electronic mail.

To really put a dent in backlogs, there's our smart COBOL editor. With automatic syntax checking. Cross-referencing. Formatting. Scanning. Zooming. And more.

Coming soon are more interactive applications for both DP professionals and business users. Including an application language for the MidFrame that even novices can use.

Nothing to lose.
Users retain full, unobstructed access to all TSO facilities—including MVS data sets/files—via an ISPF-like user interface that virtually eliminates retraining. Other VTAM applications are available in passthrough mode. Of course, security and data integrity are maintained throughout the system.

Evolutionary growth path.
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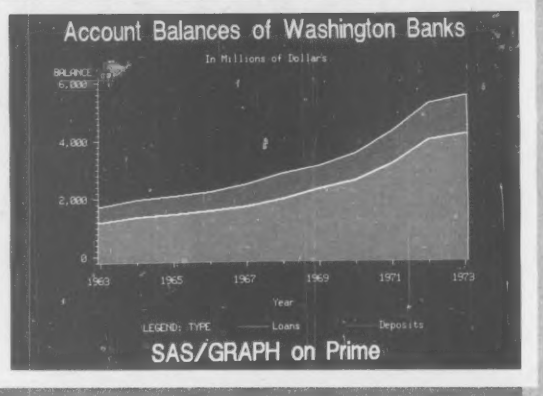
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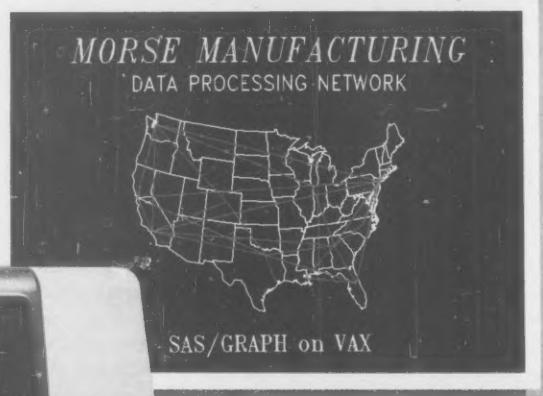
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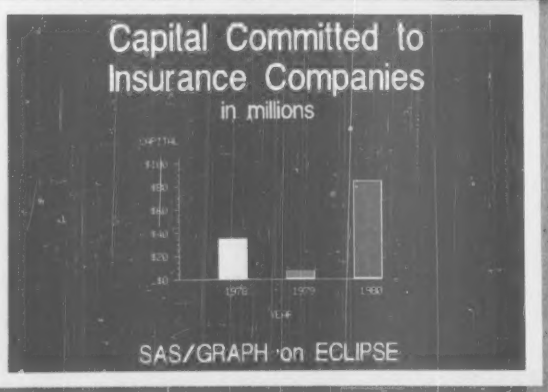


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Two Services Announced by Sita At Conference

By Katherine Hafner
CW Staff

NEW YORK — Sita, the telecommunications and information service for major airlines throughout the world, held its first North American conference here recently, with 162 attendees representing 75 different carriers from North and Central America.

In addition to providing a two-day informational forum for Sita members, the conference served as a launching pad for two announcements:

- An agreement with the Los Angeles International Airport (LAX) for a shared terminal system in that airport's new West Terminal.
- The automation of TIM, the travel information manual published monthly to provide travelers with passport, visa and vaccination information.

Sita, a nonprofit organization owned cooperatively by 248 airlines around the world, coordinates telecommunications for its members using nine centers around the world that serve 950 cities in 154 countries. Sita's facilities are used for every facet of the airline industry, from on-line reservations to baggage tracing.

Depending on the size of the member airline, Sita can either act as the airline's sole network or work in conjunction with an airline's private network when communications demands reach beyond the network's capabilities.

The plan for shared terminals at LAX, to be implemented by April 1984 in time for the Olympics, would allow the airlines occupying the new West Terminal to overflow to adjacent check-in counters during peak hours, according to Philip Freeman, British Airways' North America telecommunications manager.

At the new LAX wing, each airline will be allocated five terminals for its check-in counter. Assuming one carrier's peak period is another's slack time, Freeman said, an extremely busy airline can spill over to the next counter, where terminals would otherwise stand unused, and double their processing capability.

(Continued on Page 84)

Northern Telecom Unveils Enhancements to SL-1 PBX

NASHVILLE, Tenn. — Northern Telecom, Inc. has announced a series of new products and enhancements said to increase the data handling capabilities of its SL-1 digital private branch exchange (PBX).

The announcements introduce enhanced versions of the SL-1, IBM 3270-related capabilities, options designed to permit direct digital communications with other compatible switching systems or computers and a store-and-forward voice messaging service integrated with the SL-1 system.

Beginning in the first quarter of 1984, the SL-1 family will comprise the SL-1M, serving from 40 to about 300 lines, and the SL-1N, serving up to 840 lines in a nonblocking configuration. The SL-1 will also comprise the SL-1XN, serving up to 3,000 lines, virtually nonblocking.

The SL-1N can support up to 1,500 lines and the SL-1XN up to 5,000 lines for users with lower traffic capacity requirements, a vendor spokesman said. All versions of the SL-1 are priced at approximately $1,000/line.

An IBM 3270 emulation feature for the SL-1 is said to permit most Ascii asynchronous terminals to operate as IBM 3270-type, on-line terminals.

A protocol conversion unit allows up to seven asynchronous terminals to be connected to various mainframe computers through the SL-1, a vendor spokesman said. A seven-port conversion unit will be available for $7,000 in the first quarter of 1984.

Two devices, a computer-to-PBX inter-

(Continued on Page 80)

For City-to-City Service

NY State Inks Telephone Pact

By David Myers
CW Staff

ALBANY, N.Y. — Declaring "bypass" a dirty word, the New York state government has found a way to get cheaper city-to-city telephone service without entangling itself in a complicated phone system to avoid the telephone company's local loop.

The state's Office of General Services here has inked a five-year $6.8 million contract with Syracuse, N.Y.-based Eastern Microwave, Inc. for voice-channel service between Albany and three other New York cities — Buffalo, Syracuse and the Big Apple.

State Director of Telecommunications John T. Heinsohn told *Computerworld* in a recent interview that the microwave service would save the state $3 million a year on government-business phone calls.

He said Eastern Microwave is charging $2.6 million less than New York Telephone, the state's Bell operating company — "and that's before New York [Telephone's] proposed rate increase," Heinsohn added.

The contract between Eastern Microwave and the state freezes rates for five years. By contrast, a state planning study predicted the breakup of AT&T would force New York to shoulder annual rate increases from Ma Bell, easily doubling its phone costs.

Eastern Microwave, the 19-year-old-

(Continued on Page 80)

Package Allows DEC, Sperry Communication

LITTLETON, Colo. — Electron Information Systems has announced its Asynchronous Telecommunications Software Package said to enable microcomputers running the Digital Research, Inc. CP/M system to communicate with Sperry Corp. 1100 mainframes.

The software allows for file transfer of standard Ascii data, or the user may select a conversational mode to interface with the Sperry. Handshaking takes place at 300 to 1,200 bit/sec via standard cabling or dial-up telephones, a spokesman said.

The package is available for $795 from Electron Information Systems, 5554 S. Prince St., Littleton, Colo. 80120.

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N.Y. Inks Pact for City-to-City Telephone Service

(Continued from Page 79)

closely held subsidiary of Newhouse Broadcasting Corp., is providing microwave dishes and direct-voice cable connection to the Honeywell, Inc. tandem switching facilities already owned by the state.

"It's not really bypass — that's become an ugly term in government circles — because we're not buying it. We're getting it from a common carrier. The state doesn't want to be in the business of running its own system," Heinsohn said.

Eastern Microwave is regulated by the New York Public Service Commission, and because of that it has to offer "the same deal" — a five-year fixed rate — to other customers who want it, said Arthur F. Perkins, the company's general manager.

'It's not really bypass — that's become an ugly term in government circles — because we're not buying it. We're getting it from a common carrier. The state doesn't want to be in the business of running its own system." — John Heinsohn, director of telecommunications, New York state.

AT&T Long Lines, the Bell System's long-distance arm, could not afford to offer New York state a five-year deal because "then they'd have to offer it to everybody else," Perkins said.

A spokesman for AT&T said the firm had not bid for the contract, but he would not comment further.

According to Perkins, "We charge [the state] what we'd charge anybody else. Somebody who buys a 60-channel block from us will get the same price. The state didn't get a break."

For its part, the Syracuse company was willing to risk five years of fixed rates for the chance to break into user areas it otherwise might not have been able to crack, Perkins said.

New York first doled out $4.5 million for its 1,500-trunk Honeywell tandem switches when AT&T was unable to finish an electronic tandem network for the state, Heinsohn said.

"That was a forerunner of our efforts to meet the challenge of AT&T's divestiture," Heinsohn said. The state signed its first contract with Eastern Microwave, for 240 channels of Albany-to-New York service, in February 1982. The 300 new links, from Albany to Syracuse and Buffalo, are expected to be handling government business by the first quarter of next year.

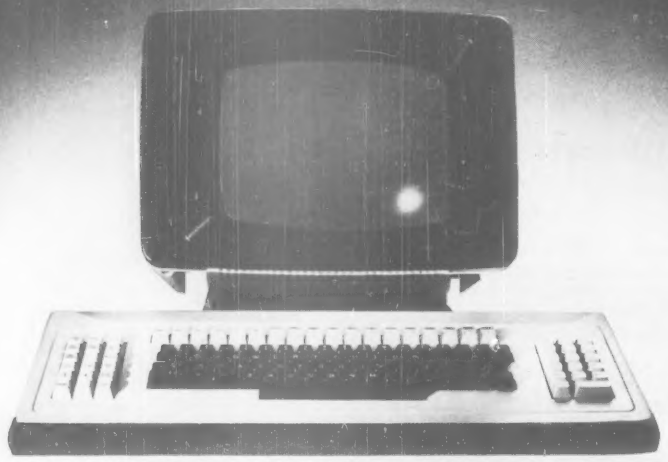
Although the state owns the switching facilities and Eastern Microwave is providing the dishes and point-to-point dial tone, New York Telephone's equipment and public lines are doing the rest.

A spokesman for New York Telephone said the phone company did not resent Eastern Microwave's piggybacking on its equipment.

"That's how MCI [Communications Corp.] got started. They're using existing network facilities. But it also opens up things for us. It provides a lot more options," the phone company spokesman said. However, he would not be more specific.

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Enhancements Said to Boost SL-1 Capabilities

(Continued from Page 79)

face and a digital trunk interface have been introduced to help users reduce data communications costs, a vendor spokesman said.

The computer-to-PBX interface is built into the SL-1 system and permits economical data communications from computer terminals, through the SL-1, to a compatible computer over standard telephone wiring or other standard transmission media.

The interface specification is based on the T-Carrier standard digital transmission rate adopted for the North American Public Telecommunication Networks based on a 1.54M bit/sec channel that can reportedly be subdivided into smaller units. A 24-channel interface device will be available in the second quarter of 1984 for $4,000.

The digital trunk interface, using circuitry similar to the computer-to-PBX interface, permits the SL-1 to transmit voice and data information in digital format directly to a compatible central office telephone switch, another SL-1 or a Northern Telecom SL-100 Business Communications System. A 24-channel digital trunk interface device will be available in the second quarter of 1984 for $4,800.

The SL-1 Integrated Voice Messaging System (IVMS) is based on an adaptation of the Commterm, Inc. EVX-1000 voice messaging system.

The IVMS allows any caller to leave a message without having to learn complex procedures or to know special access codes, a vendor spokesman claimed. Suggested price ranges from $82,000 for a 200-user system to $150,000 for a 1,000-user system. First deliveries are expected in the first quarter of 1984.

More information is available from 1001 Arapaho Road, Richardson, Texas 75081.

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Multifunction Board Fits IBM, TI Micros

SUFFERN, N.Y. — Microlog, Inc., a subsidiary of Terminal Unlimited International, Inc., has unveiled a processor-controlled communications upgrade for the IBM and Texas Instruments, Inc. personal computers.

Babytalk, which also fits other brands of bus-compatible computers, is a multifunction board described by Microlog as capable of handling communications and data management tasks as background operations while the host processor performs foreground functions.

Babytalk is priced at $895 from Microlog at 222 Rt. 59, Suffern, N.Y. 10901.

Videotex Service Unveiled

WILTON, Conn. — A North American presentation level protocol syntax (NAPLPS)-based, business-to-business, advertiser-supported videotex service has been announced by Videotex Information Corp. (VI).

Videolog is a catalog for the electronics industry that will be expanded in 1984 to include an on-line directory of all manufacturers of electronic components, equipment and services. Industry news plus advertiser-supported information on products, specifications and new product announcements will also be included, the vendor said.

The system will be accessible by dumb Ascii terminals, popular personal computers and the new NAPLPS terminals such as AT&T's Sceptre.

The service is aimed primarily at design engineers and purchasing agents, the vendor said.

According to Alan Brigish, president and chief executive officer of VI, on-line charges to users will be less than 17 cents per minute. More information is available from VI at 213 Danbury Road, Wilton, Conn. 06897.

For Apple Micros

Modem, Software Package Out

NORCROSS, Ga. — Hayes Microcomputer Products, Inc. has announced a modem and communications software package, the Micromodem IIe and Smartcom I, for Apple Computer, Inc. products.

The Micromodem IIe provides AT&T's Touch-Tone dialing, pulse dialing, a speaker and support for both single-line and multiline connections. It operates with Apple Computer, Inc.'s Apple II, II+, IIe and III computers.

The Smartcom I program directs the modem to place and answer computer calls and to send and receive files with any of three file transfer protocols. The software operates under Apple's DOS 3.3 and Digital Research, Inc.'s CP/M operating systems.

The Micromodem IIe communicates over telephone lines at 300 and 110 bit/sec, and is compatible with any Bell 103-type modem.

The software package costs $329. Current owners of the Micromodem II may purchase Smartcom I separately for $119, the vendor said from 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.

Disk Links Exchange To Micros

McLEAN, Va. — Source Telecomputing Corp., a subsidiary of the Reader's Digest Association, Inc., is offering a software disk to link its electronic service to personal computers.

The company's electronic service, called the Source, is a central exchange for business and financial information, news and sports scores, travel advice and games. It costs $20.75 per weekday hour.

The new software, dubbed the Sourcelink, works on IBM's Personal Computers. A package for Apple Computer, Inc.'s equipment is under development, according to Source.

Sourcelink is priced at $149. It is now available from Source Telecomputing at 1616 Anderson Road, McLean, Va. 22102.





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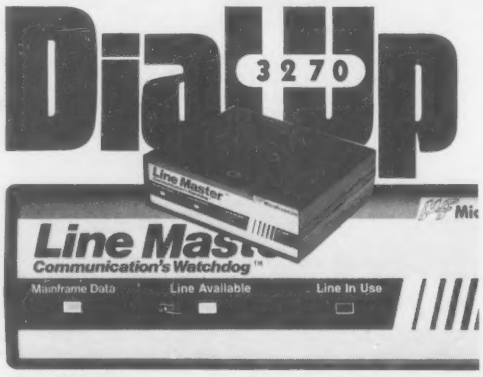
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Photographed at IBM Data Center, Chicago, IL

Assembler Assists X.25

ALEXANDRIA, Va. — Dynatech Packet Technology, Inc. has unveiled a two-trunk packet assembler/disassembler that interfaces with asynchronous terminals and acts as host to Ansi X.25 networks.

Designated the Model 232, the device supports from eight to 32 ports. It comes in two versions: one capable of connecting trunks at speeds from 1.2K bit/sec to 19.2K bit/sec and another capable of handling trunk speeds of up to 64K bit/sec.

The packet collects usage information to aid in billing and to link level statistics to monitor trunk-line quality. Its maker said it can be connected to any public or private X.25 network.

The new device includes a password-protected port for remote control and diagnosis. Each of its remaining ports can be given an individual configuration. It will support asynchronous devices with schemes for data forwarding, flow control and editing.

Price on a 23-port packet ranges from $10,000 to $16,000.

Delivery is four to six weeks from Dynatech at 6464 General Green Way, Alexandria, Va. 22312.

LAX Pact Announced At Sita Meet

(Continued from Page 79)

In addition, the departure gates themselves will become "generic" in the sense that they will not be designated for use with a specific airline. Airline employees will be able to use any gate terminal after identifying themselves with a magnetically coded card. According to Freeman, this should help to alleviate the problem of overcrowding in the airport.

More Agreements Sought

Similar agreements are being negotiated with airports in Frankfort and Munich, West Germany, and Cairo, Egypt, with long-range plans in the works for Chicago, Miami and San Francisco, according to Freeman.

Timatic, the automation of the travel information manual, will go on-line next month and will be available to all Sita members by January.

Coordinated by KLM Airlines and updated monthly, the manual contains vital information on requirements for entry to countries around the world. Now the information resides in a data base in Atlanta and can be used in conjunction with Sita's Gabriel reservations system.

"Timatic is a logical extension of what you can do in real time," commented Monica Sinclair, Sita's manager of passenger services development. "We're not replacing the booklet, but we are giving the airlines the ability to retrieve this information on a real-time basis."

The next Sita conference will be held in Saudi Arabia next February or March, a conference official said.

Telephone Accounting Variation

Bitek System Monitors PBX Ports

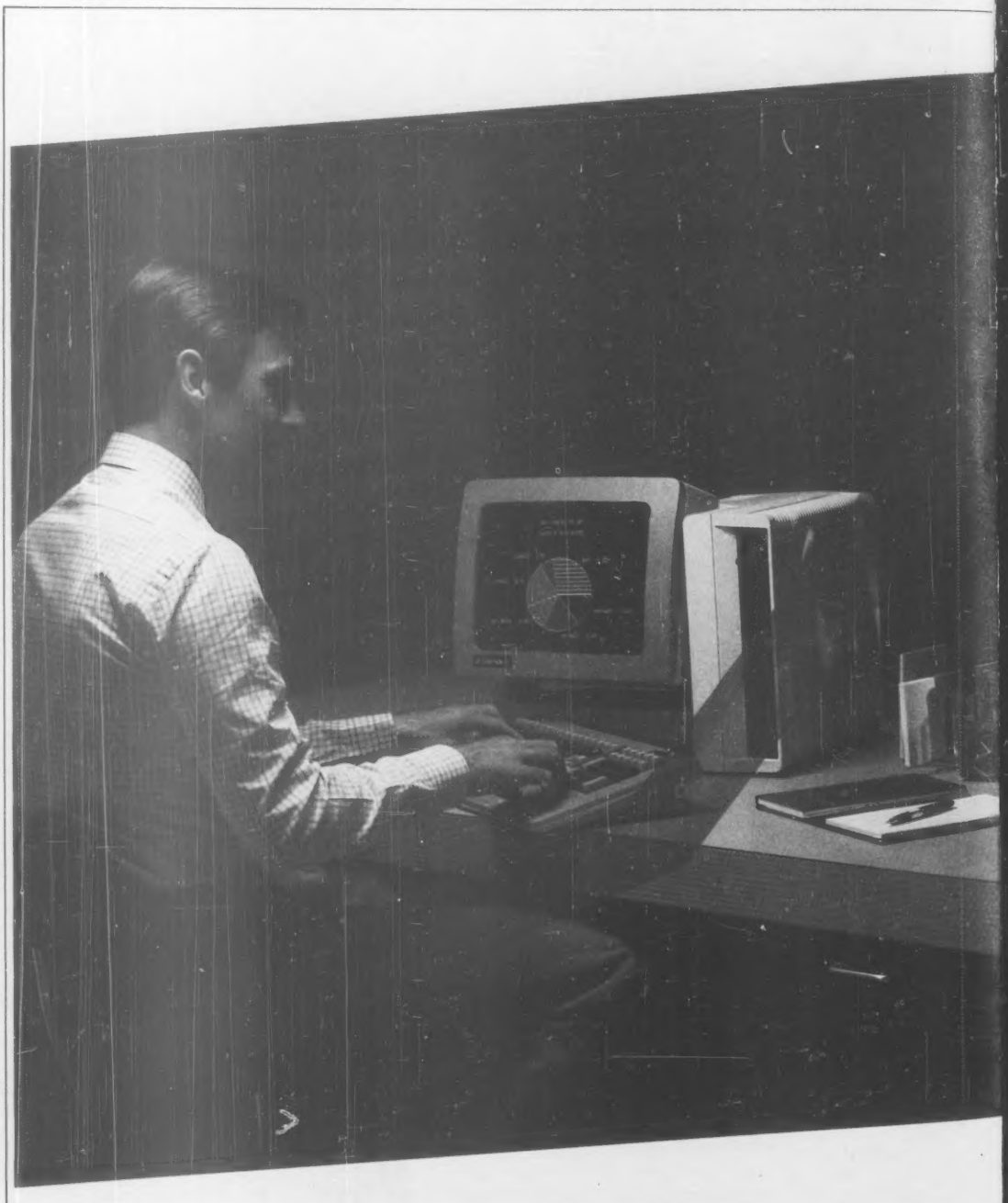
LONG BEACH, Calif. — Bitek International has put on the market a communications system for monitoring use of computer ports that are accessed over private branch exchange (PBX) lines.

The setup, called the Telcam system, is a variation on a telephone accounting system, according to a company spokesman. It consists of a minicomputer, memory, line-access cards and a software program.

It keeps track of internal connections to the computer port and records the duration of the access. External connections require data entry by the PBX attendant.

The system also generates a report on the connections, listed by terminal. Available daily or at longer intervals, the report can contain a maximum of 32,000 connection listings. Bitek said its system can handle from 20 to 2,000 calling data terminals and up to 150 computer ports.

Price ranges from a low of $17,000 for a 48-station setup to a high of $40,000. Deliveries will start in late October or early November, according to Bitek, which is located at 6015 Obispo St., .Long Beach, Calif. 90806.



Input Module Boasts Bus Compatibility

BROOKFIELD, Conn. — Connecticut Microcomputer has come to market with a 16-channel analog input module which acts as a self-contained bus-compatible device.

Designated the Model D16, the unit works with any computer fitted with an IEEE-488 interface, a vendor spokesman said.

The input module accepts commands from its host computer to read data or activate the timer and buffer. It converts data to eight bits at 100 microseconds. A built-in timer operates from 0.1 seconds to 48 hours. It is available for $495 from Connecticut Microcomputer at 36 Del Mar Drive, Brookfield, Conn. 06804.

Terminal Aids Full Page Processing

HASTINGS, Minn. — Micro Display Systems, Inc. has announced the Genius full page display terminal which allows the user to custom design a system to facilitate full page processing in all applications from data base management to word processing for automated office systems.

The Genius terminals feature 57 lines by 80 characters; reverse video; flashing attributes; phosphor choices of black/white, green or amber; multiple protocol; high resolution; and DIN standard keyboard.

This product is available in two models. The Model 202-IBM Personal Computer and IBM Personal Computer-compatible, full page Ascii terminal combines the full page, high-resolution display with a fully configured, low-profile DIN standard keyboard with ten assignable function keys. Model 212-Digital Equipment Corp. VT100 emulation is supported by a fully compatible, low-profile DIN standard keyboard.

The price is $1,995 for each model from Micro Display Systems through 1310 Vermillion St., P.O. Box 455, Hastings, Minn. 55033.

Product Pair Facilitates Transmission

BREWSTER, N.Y. — American Photonics, Inc. has introduced two fiber-optic products to be used as aids in coaxial and wire transmissions.

The RL5000 Ethernet Extender is a fiber-optic transmitter and receiver that, along with a suitable fiber-optic cable, functionally replaces an Ethernet or IEEE 802.3 transceiver cable. The RL5000 provides transmission between a Xerox Corp. Ethernet local-area network transceiver and a station controller for up to 1,000 meters.

The DL1020 point-to-point fiber-optic link is used to transmit and receive data up to 10M bit/sec.

Both products are available in single quantities at costs of $1,500 for the RL5000 and $1,194 for the DL1020 from American Photonics, Milltown Office Park, Rt. 22, Brewster, N.Y. 10509.

Controller Said to Hold 320 Devices

TULSA, Okla. — Telex Computer Products, Inc. has introduced a remote control unit with extended function capability said to support up to 320 devices.

The 274C controller reportedly allows attachment of both Telex Computer Products and IBM terminal devices that support A-type coaxial cable. The controller features both IBM's protocol Binary Synchronous Communications and Synchronous Data Link Control (SDLC) communications protocols, the vendor said.

Under IBM's Systems Network Architecture (SNA) and SDLC, the 274C reportedly supports all SNA parameters as defined for the IBM 3274 41C controller. The control unit is also said to be compatible with IBM's network problem determination application program for SNA/SDLC net problem determination and isolation.

Priced at $10,000, the unit is available from Telex Computer Products at 6422 E. 41st St., Tulsa, Okla. 74135.

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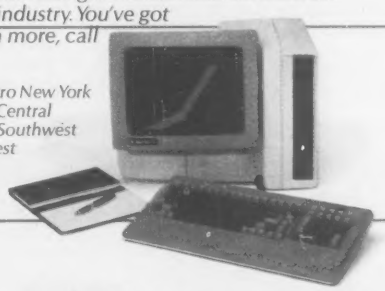
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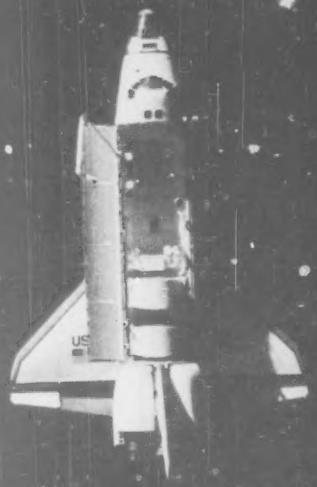


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IBM Researchers Reveal Creation Of 512K-Bit Chip

MAUI, Hawaii — In a paper delivered before a microelectronics symposium here, two IBM researchers reported their company has completed development of an experimental version of a 512K-bit memory chip.

This news came the same week IBM released its mid-range 4361 and 4383 processors, both containing a memory chip that stores 256K characters of information.

IBM said the development of the 512K-bit chip was made possible through an electronic technique called plate pushing. This technique permits the use of stronger electrical signals within the chip, which permits the use of smaller circuit elements and fewer connections. This is what is responsible for the wafer's increased capacity.

Analysts predict the chip will be most useful in large-scale systems such as the company's 3080 series, which is capable of carrying out a minimum of 4 million instructions per second (Mips) and in its most powerful configuration can execute 23 Mips.

Most analysts were more surprised by the fact that IBM made such an announcement than by the news of the chip itself. "There's no doubt that IBM will be at the forefront," said Thomas J. Crotty, vice-president of Gartner Group, a marketing research firm, "but I am surprised they are talking about the 512K-[bit] publicly."

"In the old days," one analyst said, "such an announcement meant that commercialization was about five years away. But at the current pace, it could well be three."

DEC Expands LSI Line With J-11-Based Board

HUDSON, Mass. — Digital Equipment Corp. unveiled three single-board, Q-bus-compatible microprocessors, including one that integrates the company's new J-11 processor.

The J-11-based board, called the LSI-11/73, is a high-end addition to DEC's LSI series of board-level products said to have four times the performance capabilities of the LSI-11/23. A spokesman said the LSI-11/73 is the performance peer of the company's PDP-11/44 minicomputer.

With the J-11 as its CPU, the LSI-11/73 is compatible with all PDP-11 operating systems and will run DEC's version of the Unix operating system. The processor holds up to 8K bytes of random-access memory (RAM) and has 8K bytes of on-board cache memory.

The LSI-11/73, which is compatible with all Q-bus peripherals, costs $2,180 and is scheduled to be available in January.

The firm also unveiled the KXT11-C, a Q-bus peripheral processor the company said can be linked to any LSI-11-based computer or can serve as a single-board computer for machine control applications.

Built around the company's T-11 processor, the KXT11-C holds 32K bytes of static RAM. The board has three serial communications lines, including two asynchronous and one synchronous. It also has two-channel direct-memory access controllers that pass information without causing interrupts, a spokesman said.

The KXT11-C, which is the first board permitting LSI-11 users to link processors on the Q-bus, costs $1,785 and is also expected to be available in January.

The third processor is an improved version of DEC's Falcon that supplies four times the minimum and six times the maximum memory of its predecessor.

Dubbed the Falcon-Plus, the processor contains 16K bytes of RAM and can be expanded to 48K bytes, compared with its predecessor's 8K bytes of maximum storage.

Priced at $790, which is the same as the Falcon, the dual-height board employs a new gate array technology and board design. Falcon-Plus will be available early next year.

Besides the three microprocessors, DEC also announced software that allows applications packages for LSI-11 systems to be developed on VAX/VMS and PDP-11 computers with multiuser operating systems.

DEC is located at 146 Main St., Maynard, Mass.

With Version of 680/30

CIE Enhances 680 Business Line

IRVINE, Calif. — CIE Systems, Inc. has introduced the latest addition to its 680 multiuser business computer family, the 680/35.

The 680/35 is said to be an enhanced version of the mid-range 680/30. Both models are available in either desktop or console configurations. The 680/35 offers users increased disk storage capacity with an 84M-byte drive vs. the 40M-byte maximum offered with the 680/30. The new disk drive unit comes with an integrated 20M-byte streaming magnetic tape drive for data backup.

Users will have the option of adding an additional 84M-byte disk drive to the system for a total disk capacity of 168M bytes, the vendor said.

The new model features a standard 512K bytes of main memory, expandable to a maximum of 768K bytes; a 500K-byte, 5¼-in. double-sided, double-density floppy drive; four RS-232C ports and one Centronics Data Computer Corp. parallel printer port.

The CIE System 680/35 is base priced at $24,590 from CIE Systems, which can be reached through P.O. Box 16579, 2515 McCabe Way, Irvine, Calif. 92713.

NS789 Card Fits VAX

SANTA CLARA, Calif. — National Semiconductor Corp. has introduced a 1M-byte random-access memory (RAM) card that is said to be fully compatible with Digital Equipment Corp.'s VAX 11/780 64K-byte RAM technology.

The dynamic Nmos, designated NS789, supports the VAX hardware, software, system and standard peripheral options and operates in conjunction with VAX memory controller logic, the vendor said.

The memory card is reportedly configured as a 256K-byte by 39-bit — 32-bit data plus 7-bit error correction code — hex-wide circuit card providing 1,024K bytes of memory.

A company spokesman said the card may be installed by operators with a minimum of downtime.

The vendor also said the design of the card allows the mainframe CPU to access the memory at high rates of speed, with typical read-access time of 222 nsec and read/write/refresh cycle time of 425 nsec. It is provided with an on/off-line switch permitting users to isolate the card from the system without having to remove it from the backplane, National Semiconductor said.

The boards are priced at $2,700 each by National Semiconductor, 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

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Color Graphics CAD System Targets Printed Circuit Uses

HOUSTON — Summit CAD Corp. has introduced a color graphics computer-aided design (CAD) system for printed-circuit design applications, compatible with the IBM Personal Computer.

The Pathfinder software supports schematic creation, net lists capture, parts list capture, net list validation, computer-aided placement, autorouting of traces, interactive on-screen routing, continuity and space checking, engineering report generation, drill, assembly and support-drawing generation, numerical control tape generation and final film generation.

The Pathfinder system may also be used for nondesign functions with IBM Personal Computer programs such as word processing, mainframe communications and financial planning, the company said.

A standard configuration costs $29,975 and consists of an integrated mobile 1,664K-byte random-access memory (RAM) workstation, two 360K-byte diskette drives, 1M-byte hard disk, 83-key detached keyboard, 14-in. color display, 12-in. monochrome monitor, optical mouse, dual Motorola, Inc. 68000 processors and an 8087 floating-point processor.

Additional information about the Pathfinder system may be obtained from Summit at 5222 FM 1960 West, No. 102, Houston, Texas 77069.

Monitor Adapter Board Out

LOS GATOS, Calif. — Eagle Computer, Inc. has announced a color graphics monitor adapter board, which offers color display and graphics capabilities for Eagle and IBM microcomputers.

Capable of operating in color or monochrome, the color graphics adapter offers medium resolution of 320- by 200 pixels and is available with 16 foreground and eight background colors. A high resolution of 640- by 200 pixels may be displayed in the monochrome mode.

Packaged on a single card, the board fits in the hardware extension slots of an Eagle PC, 1600 or IBM Personal Computer, according to the vendor spokesman.

The board costs $295 from Eagle Computer, located at 983 University Ave., Los Gatos, Calif. 95030.

National Memory Systems Enters Micro Memory Mart

LIVERMORE, Calif. — The National Memory Systems Corp. has taken its first step outside the market for minicomputer memories by unveiling a memory subsystem for the IBM Personal Computer and compatible micros.

Called the PC-8000, the new subsystem attaches up to 1,000M bytes of memory storage to the computer. The vendor said it can be used with very large data bases or for software development and as a file server for computer networking.

The setup consists of a controller and one or two disk drives with 16M bytes to 500M bytes of capacity each. It is compatible with both fixed and removable disk media.

The device's access time is 17 msec. The memory will work with IBM's Personal Computer or Personal Computer XT, Compaq Computer Corp.'s Compaq, Victor Business Products, Inc.'s Victor 9000, Columbia Data Products, Inc.'s Multi-Personal Computer and Eagle Computer, Inc.'s Eagle PC, according to a company spokesman.

Prices range from $6,600 to $11,900 in 30-piece quantities. Delivery is four weeks, the vendor said.

National Memory is at 355 Earhart Way, Livermore, Calif. 94550.

Flexible Diskette From Dysan Fits DEC RX50Ks

SANTA CLARA, Calif. — Dysan Corp. has announced the availability of a 5½-in. flexible diskette said to be compatible with Digital Equipment Corp. RX50K disk drives, found in all DEC Rainbows, Decmate IIs, Professional 300 series and Micro II personal and business computers.

The DEC RX50K Format one-sided diskette reportedly offers the standard features found in the DEC disk, including double density, soft sectoring and 96 track/in. The Dysan version of the diskette has its own individual proprietary identification code, which makes it DEC-compatible. Previously, this code was only offered on diskettes sold by DEC, a spokesman said.

Guaranteed 100% error-free, Dysan's disks are offered on an off-the- shelf basis. The suggested list price for the DEC RX50K Format is $59.50 per box of 10, from Dysan, 5201 Patrick Henry Drive, Santa Clara, Calif. 95050.

Disk Drive, Printer Offered For Micros

ELK GROVE VILLAGE, Ill. — NEC Home Electronics, Inc. (Neche), has taken the wraps off two peripheral devices for personal computers: a letter-quality daisywheel printer and a hard disk drive.

The bidirectional printer, called the 15-LQ, has a built-in Centronics Data Computer Corp.-type parallel interface, reportedly giving it compatibility with microcomputers from Radio Shack, IBM and Apple Computer, Inc.

Equipped with a tractor feed, the device prints up to 14 char./sec, according to Neche, the U.S. subsidiary of Tokyo-based NEC Information Systems, Inc.

The hard disk drive is compatible only with NEC's Model PC-8800 microcomputer, Neche said. Three versions of the drive open up differing amounts of storage: 5M-, 10M- and 15M bytes.

Neche said the product introductions mean that for the first time, the company is offering all devices required for an entire microcomputer system.

The price of the printer is $695, according to a spokesman for the vendor. The drives sell for $2,295, $2,595 and $2,995. Neche is located at 1401 Estes Ave., Elk Grove Village, Ill. 60007.





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Dixon R. Doll, Ph.D.—Founder, President, and CEO of the DMW Group, one of the industry's most well-known independent telecommunications and information systems consulting firms. He is widely recognized as an expert in design, planning, and implementation of advanced computer systems and communications networks.

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SMC Plans to Unveil SMP/8301

DALLAS — The SMC Technology Corp. plans to unveil a storage management processor to fit between CPUs and the secondary storage devices associated with them.

Called the SMP/8301, the new device is aimed at those firms with very large data bases, according to a spokesman. It will initially be available on the Gould, Inc. line of 32-bit superminis for IBM and other hosts plus their operating systems.

The processor is said to reduce I/O operations by making the ratio of relevant data to transferred data as functional as possible.

It is put to use through extended concepts in a function space architecture as developed by Set-Theoretic Information Systems Corp. of Ann Arbor, Mich. SMC Technology is independent of the Ann Arbor research firm, a spokesman said.

Costing from $200,000 to $1 million, SMP/8301 will be available in the fourth quarter of 1985 from 320 Forest Central Two, 11551 Forest Central Drive, Dallas, Texas 75243.

Ink-Jet Printer Debuts for TRS-80

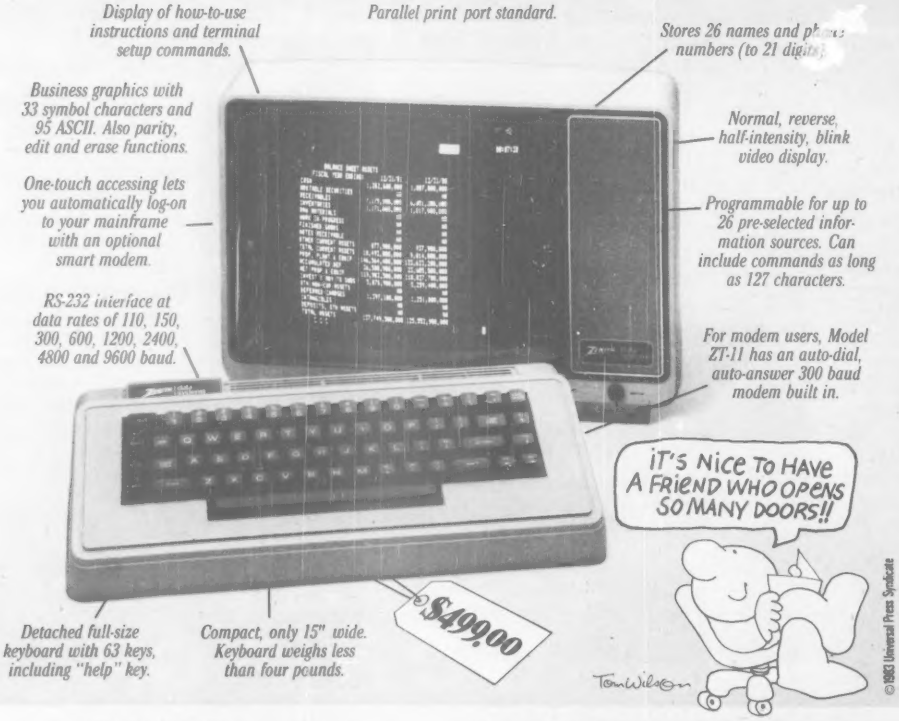
FORT WORTH, Texas — The TRS-80 CGP-220 ink-jet printer from Radio Shack is a drop-on-demand printer designed to print text and graphics in seven colors.

The CGP-220 prints 2,600 dot/sec in graphics mode with a resolution of 640 dot/line. The text mode offers 12 char./in. at 37 char./sec.

Parallel and color computer-compatible serial interfaces enable the printer to be used with any TRS-80 computer. A screen print utility for the TRS-80 color computer will allow the CGP-220 to create multicolor printouts.

The CGP-220 printer costs $699 from Radio Shack dealers. The company is headquartered at 1800 One Tandy Center, Fort Worth, Texas 76102.

There's a lot to like about the new Zenith ZT-10, starting with the price.



The Zenith ZT-10 represents a major advance in data access terminal engineering. And a major break-through in price/performance.

With the ZT-10 you get an RS-232 port and DEC VT-52 compatibility. Teamed with any Zenith green or amber video monitor, the ZT-10 is perhaps the lowest cost 9600 baud ASCII terminal yet.

Best of all, this terminal-in-a-keyboard actually gives you more for less. Great access power, for instance. With its menu table and single master key you've got one-touch access to mainframes, minis, micros—and any VT-52 terminal system!

Behind the ZT-10 and every Zenith product is our regional distribution network. This assures you the best in service and support, as well as the fastest possible delivery.

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Dual Systems Upgrades 8320 To Include RTK

BERKELEY, Calif. — Dual Systems Corp. has upgraded its Motorola, Inc. 68000-based microcomputer, the 8320, to include floating-point processing and a real-time operating system kernel (RTK).

The Unix system's single-card, floating-point processor reportedly performs over 222,000, 32-bit add, subtract and multiply operations per second. The user-transparent processor does division, square root, logarithm and triometric functions at rates ranging from 68,000 to 11,500 operations per second on IEEE-compatible, 32-bit single-precision and 64-bit double-precision floating-point data.

The RTK is said to allow real-time control software to be developed on Dual System's 8320 Unix system and then to be downloaded and run on the basic minimum system. Also, the completed RTK operating system may be burnt into erasable programmable read-only memories.

Other enhancements include: an upgraded clock rate of 10 MHz; an upgrade of the Unix Version 7 operating system to the Unix System III; a faster multilayered motherboard; a nine-track backup storage system; and software improvements such as Softest's Lex word processor, Unicorp Software, Inc.'s Viewcomp spreadsheet, Micro Business Software, Inc.'s MBSI accounting package and Unify Corp.'s Unify data base. Additional languages available include Lisp and Ada.

The enhanced version of the 8320 costs $16,660 from Dual Systems, 2530 San Pablo Ave., Berkeley, Calif. 94702.

Power Stacker Gathers Forms In Sequence

PALO ALTO, Calif. — The Tab Products Co. has unveiled a power drop stacker to gather burst forms in sequence during long runs.

Called the Model 2470, the stacker is being offered by the company as an optional accessory to its Model 2476 burster.

The stacker's one adjustment is for length of forms. The device automatically compensates for the forms' thickness and margin buildup on stacks up to 24 inches.

The Model 2470 stacker will be available Nov. 1 for $1,250 from Tab at 2690 Hanover St., Palo Alto, Calif. 94304.



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From Northern Telecom

Model 445 DDP Memory Increased

MINNEAPOLIS, — Northern Telecom, Inc., has announced an increased memory capacity for its Model 445 distributed data processing (DDP) system.

The enhancement brings the system's memory up to 384K bytes in performing DDP operations, a 50% increase, the company said. The expanded memory enhancement is the first in a series planned for customers using the firm's 400 and 70 series DDP systems.

Proprietary software available includes the Omnitask 4.1 operating system, Omniwords word processing, Sedit text editing, Omnilink networking and Acobol/3.

The new capability is available now for $750. Monthly leases cost $28 for a two-year period or $23 for three years. Maintenance is priced at $10 per month.

More information is available from the vendor at Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.

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IBM announced its 3178 on March 8, 1983. The PHAZE P3278 has been available since November 8, 1982. Our lower cost, more functional 3278/3178 alternative is available now. And, at $1545, our coax plug-compatible P3278 will be the star of your add-on and replacement program. That's because PHAZE makes the addition easy. More importantly, you'll get a host of special features not found on theirs. That makes PHAZE a good buy, and a superior value.



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The compact, modular P3278 can be installed in less than 60 seconds. Without heavy lifting. Without tools. Easy installation reflects the human engineering features of the unit. Features like an easy-on-the eyes, non-glare screen that tilts and swivels with fingertip command. A thin movable keyboard, with a continuously adjustable angle through the optimum range. And PHAZE meets the tough European human factors requirements.

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Card Reader Facilitates Two Modes

PLYMOUTH MEETING, Pa. — Peripheral Dynamics, Inc. has unveiled an automatic card reader said to be quiet enough for office use.

Designated the Model 6111, the device is capable of reading 600 cards a minute. It is available in two versions: one reads 80-col. punched cards in transmissive mode, and the other reads 40- and 80-col. mark-sense cards in reflective mode.

Options on the reader include an RS-232C interface, current-loop interface, clock track on mark-sense cards and nonstandard card reading speeds.

The card reader is priced at $2,375. Delivery time is eight weeks.

Peripheral Dynamics is located at 5150 Campus Drive, Whitemarsh Industrial Park, Plymouth Meeting, Pa. 19462.

Interface For HP 3000 Introduced

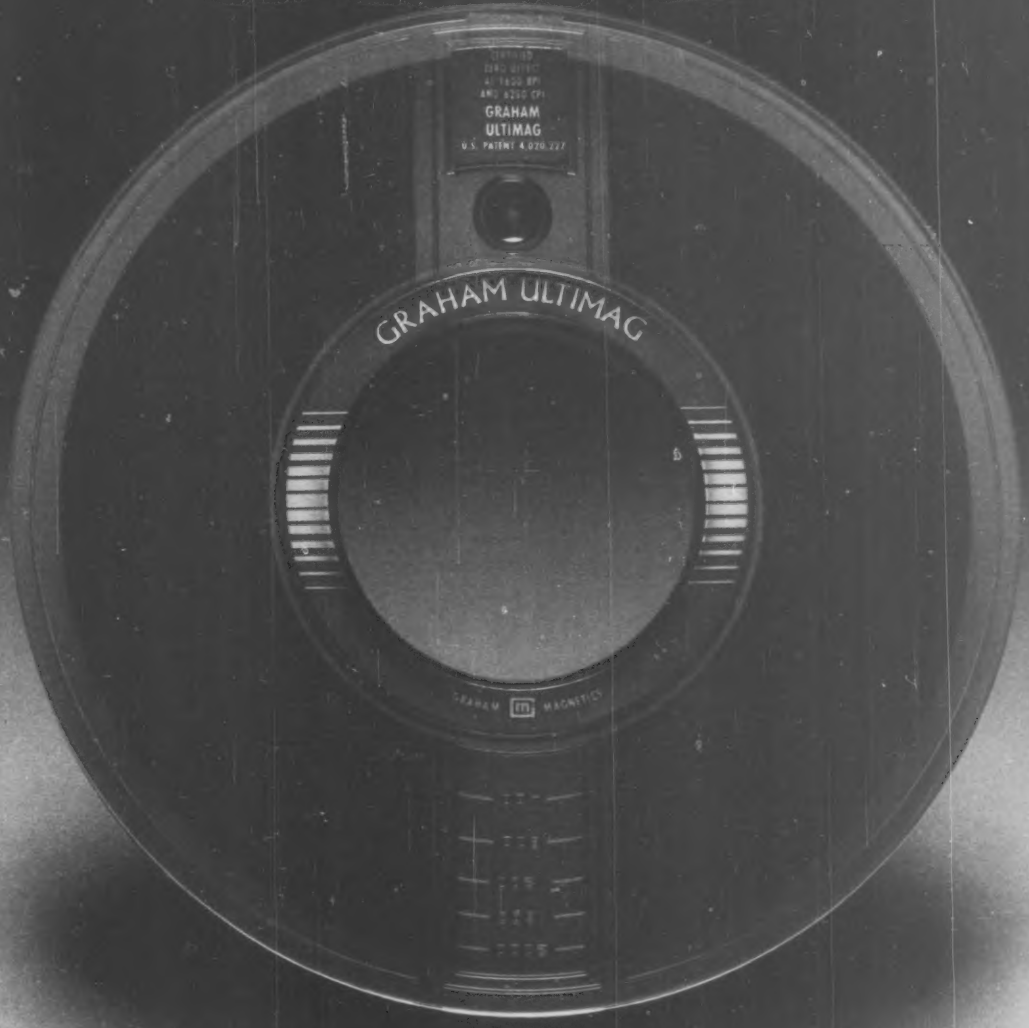
STAMFORD, Conn. — Digital Associates Corp. has introduced a high-speed printer interface for the Hewlett-Packard Co. HP 3000 series (3000/3X through 3000/6X) systems.

The HP-IB interface, upgraded from an earlier product, shares a high-speed general interface channel with disks and other independent network processors. A separate interface channel is not normally required to interface Digital Associates' plug-compatible printer systems to these HP processors, a company spokesman said.

The HP-IB interface saves a slot for other peripheral applications and eliminates the need for a separate HP 26069A translator card for operation of a line printer. In addition the interface can drive multiple line printers from the same general interface channel, the firm said.

The stand-alone price of the HP-IB interface is $2,500 from Digital Associates, 1039 E. Main St., Stamford, Conn. 06902.

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GRAHAM ULTIMAG,™ THE ULTIMATE IN MAGNETIC COMPUTER TAPE, is manufactured on Graham's new state-of-the-art coating line. Each reel is then independently full-length certified error-free at both 6250 CPI *and* 1600 BPI on the Qualifier* (Graham's new advanced technology certifier). This new and revolutionary product is the culmination of many years of extensive research, planning and investment by Graham Magnetics, the industry leader in computer tape technology.

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Compatible With Victor 9000

Hard Disk Storage System Enhanced

ANAHEIM, Calif. — IQ Systems, a subsidiary of Applied Circuit Technology, Inc., said its hard disk storage systems are now compatible with the Victor Technologies, Inc.'s Victor 9000 business computer.

The 5¼-in. Winchester disk setups, called the Graymatter family, were previously compatible with Apple Computer, Inc.'s Apple II and IIe, IBM's Personal Computer and Osborne Computer Corp.'s Osborne I, according to IQ Systems.

The storage unit is available in versions with 5M, 10M and 20M bytes of memory.

Designed by Claremont, Calif.-based Lodestar Systems, Inc., the software package enables the storage unit to run on the Victor computer's Digital Research, Inc. CP/M 86 and Microsoft, Inc. MS-DOS dual operating codes.

It costs $2,195 from IQ Systems, 2931 La Jolla St., Anaheim, Calif. 92806.

Corvus Cuts Storage Systems Prices

SAN JOSE, Calif. — Prices of the Corvus Systems, Inc. Winchester mass storage systems have been reduced by up to 14%.

The 5.9M-byte Model 6 unit is now priced at $2,195, down from $2,495. The 12.1M-byte Model 11 has been reduced from $3,495 to $2,995, while the 18.4M-byte Model 20 now costs $3,995, down from $4,495.

Prices of add-on disk drives, Omninet disk systems and Omninet disk systems with built-in Corvus mirror back-up storage capability have also been reduced, Corvus said from 2029 O'Toole Ave., San Jose, Calif. 95131.

Storage Unit Designed for Use With Desktop

MINNEAPOLIS —. Northern Telecom, Inc. has introduced a 10M-byté hard disk storage unit intended to be used with its desktop office information system.

The unit, called the Model 5010, is equipped with a 5¼-in. mini floppy disk for load and backup plus a 5¼-in. Winchester hard disk drive for storage. It also holds its own power supply and logic cards.

The new storage unit connects electrically to Northern Telecom's Model 503 desktop system via shielded flat ribbon cable.

The unit's price is $3,870. It is expected to be available Oct. 21 from Northern Telecom through Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.

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Nu Data Unveils Add-On Devices For Printers

LITTLE SILVER, N.J. — The Nu Data Corp. has introduced a single-line and a multiline loop converter and a message waiting device for computer printers.

The loop converter, named the Model 319, is arranged as a full-duplex unit which can convert to 20mA loop current signals at up to 19.2K bit/sec. The multiline version incorporates 12 full-duplex converters. It is a 3½- by 19-in. rack that operates at 110 Vac and 60Hz.

The message waiting device, called the Model 610, is designed for offices in which the printer is up to 1,000 feet from the computer. The 4- by 3-in. device lights up when a message has been received. Both types of device connect via an RS-232 data link, a spokesman said.

Price is $125 for the single-line converter, $1,250 for the multiline converter. The message waiting device costs $95. Both are available from Nu Data, 32 Fairview Ave., P.O. Box 125, Little Silver, N.J. 07739.

Cesi Adapter Fits Omnipac, PDP-8A Minis

HOUSTON — Computer Extension Systems, Inc. (Cesi) has announced the MDC8 host adapter, an intelligent hexwide printed-circuit board for Cesi's Omnipac and Digital Equipment Corp.'s PDP-8A minicomputers.

Utilizing families of 5¼- and 8-in. Winchester disk drives, the MDC8 and Sasi disk controller allow the addition of a disk storage system to all DEC Omnibus-based systems, according to Cesi.

Each unit will support two Winchester drives and two floppy drives, the vendor said.

Cesi supplies OS/8 software handlers with the MDC8 along with technical manuals for $1,250 from 17511 El Camino Real, Houston, Texas 77058.

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Team Xerox

But what some people may not know is that the 8010 is also the key element in Team Xerox, a system of office machines designed to work together like a team.

When part of an Ethernet network, the 8010 can work with a wide array of word processors, mainframes, personal and business computers, printers, electronic mail and file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other 8010's. It also provides 3270 and TTY emulation.

Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, the 8010 simply does more with them.

For example, the 8010's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

In terms of capabilities, ease of use and overall value, the 8010 would have to be considered the stellar workstation in the industry.

For more information, call 800-527-1922 (in Texas, 800-442-0152), or send in the coupon. Or ask anyone who's ever used the 8010.

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Bits & Pieces

General Robotics Cuts Price of Workstation

HARTFORD, Wis. — General Robotics Corp.'s Computer-Aided Design (CAD) Systems Division has announced a price reduction on its printed circuit CAD workstation, the PCB Draftsman II. The domestic price has been reduced by more than 6%, the vendor said.

The PCB Draftsman II workstation is an interactive tool for the layout of printed circuit boards by PCB designers. The hardware consists of a dual computer using Digital Equipment Corp.'s LSI-11/12 front-end with memory management and hardware floating point processor. The graphics computer is a high-speed, 32-bit bit-slice CPU, with up to 2M bytes of display memory.

The software provides single keystroke functions, autorouting, autoplacement, schematics, design rule checking and network listing.

The price is $69,900 and includes one week of on-site training. Further information is available from General Robotics, CAD Systems Division, 57 N. Main Street, Hartford, Wis. 53027.

Unit Ties Peripherals, VMEbus Compatibles

SUNNYVALE, Calif. — Astraea Computer Corp. has announced the AC-V31, an interface module designed to connect systems compatible with the VMEbus with external peripherals using the Sasi interface.

The AC-V31 resides in the VMEbus short I/O address space and occupies a user-selectable, contiguous 256-byte block of addresses. The unit uses a P2 connector for connection to the Sasi channel interface, the vendor said.

The unit costs $350, the vendor said from 846 Del Rey Ave., Sunnyvale, Calif. 94086.

Type 3056 Regulates Voltage, Cuts Noise

SAN DIEGO — Gould, Inc.'s Power Conversion Division has brought to market a 500W uninterruptible power supply.

Called the Type 3056, the on-line power supply continually regulates voltage and eliminates noise for personal computers, point-of-sale terminals and other kinds of sensitive load, the vendor said.

It also includes a 10-min internal battery for use during power failures. The power supply can be hooked to an external 48V battery for longer periods.

Fitted with power metal oxide semiconductor field effect transistors switching at 70 kHz, the uninterruptible supply maintains 120V output when powering nonlinear loads. It stands approximately 5-in. high and is 17-in. wide, weighing 75 lb.

Price starts at $1,450. Delivery takes four weeks.

Further information is available from Gould's Power Conversion Division, located at 2727 Kurtz St., San Diego, Calif. 92210.

U.S. Design Upgrades Controller to 64K Bytes

LANHAM, Md. — U.S. Design Corp. has unveiled a 64K-byte disk controller for its family of Winchester storage systems.

The unit upgrades the 32K bytes offered on the company's 70M-byte Digital Equipment Corp.-compatible storage systems.

With a ¼-in. cartridge backup and Q-bus interface, the controller sells for $9,995. It is currently available with deliveries of four weeks.

U.S. Design is at 5100 Philadelphia Way, Lanham, Md. 20706.

QDP-100 Series Board Targets Faster Speed

CLEVELAND — QDP Computer Systems has upgraded its QDP-100 series with a dual-CPU board, the SCS-1, said to provide an increase of speed from 4 MHz to 6 MHz to take better advantage of the capabilities of the QDP cache memory.

Also announced was a price reduction on QDP's peripheral drive. The 30M-byte hard disk add-on unit for the QDP-100 series now carries a suggested retail price of $6,995, a reduction of $1,000 from its introductory price.

The SCS-1 contains two Zilog, Inc. CPUs: the 6 MHz Z80B-CPU and a Z80A-DMA processor that reportedly permits high-speed data transfer. Other features include 128K bytes of random-access memory; two 8-in., double-side, double-density floppy disks; four serial and two parallel ports; and QDP "help" and "menu" programs, along with its Perfect Software.

This S-100 bus microcomputer now works many times faster depending on the amount of disk accessing in a given program, the vendor said. A six-slot motherboard reportedly offers more expansion capability than previously, and up to six serial ports and two parallel ports are provided.

The single-user SCS-1 6 MHz dual-CPU board costs $1,795. The SCS-1 multiuser configuration, with six serial and two parallel ports, is $2,195 from QDP Computer Systems, 10330 Brecksville Road, Cleveland, Ohio 44141.

BPS Announces Line Of Power Supplies

DALLAS — Bits Power Systems, Inc. (BPS) has announced a line of on-board uninterruptible switching power supplies that are packaged with Winchester and floppy disk subsystems.

The Model US-200 is said to ensure that the computer and associated subsystems have continuous power when the quality of the utility power is below par or missing entirely. It provides six uninterruptible outputs for programmable read-only memory programming power. Each output of this convection-cooled unit has overvoltage, overload and short-circuit protection.

Model US-200A has the same features for S-100 systems. The models are priced at $195 each from BPS, Suite B114, 11020 Audella Road, Dallas, Texas 75243.



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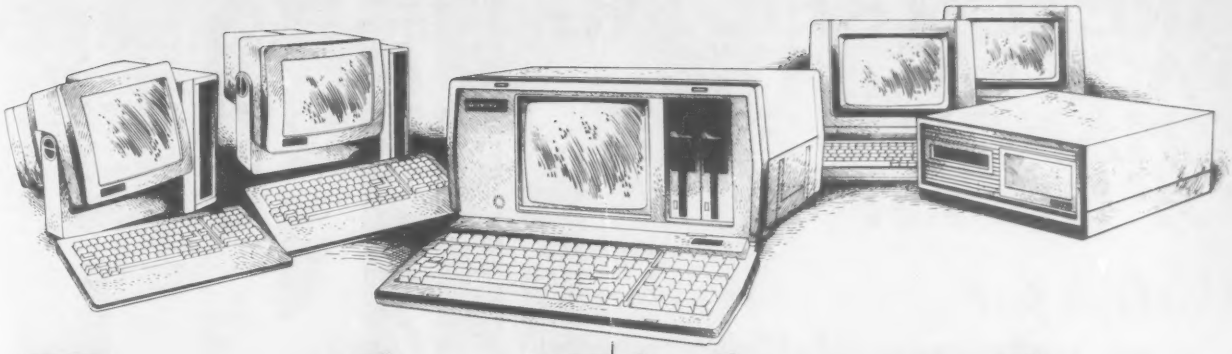
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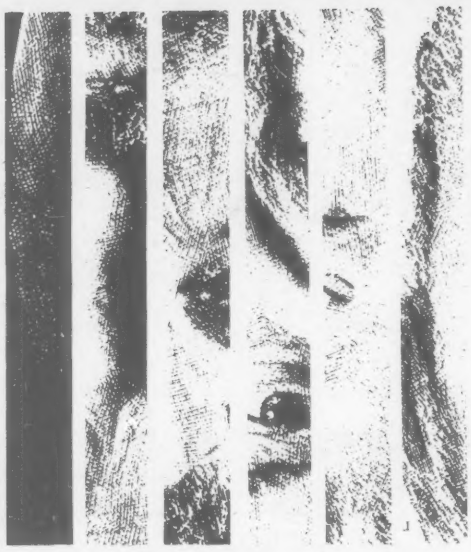
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OA Seen Propelling Business Productivity

By Jim Bartimo
CW Staff

BOSTON — By freeing up secretaries to take on executives' administrative tasks, office automation can provide American business with a quantum leap in productivity, according to David L. Shay, an office automation specialist in the New York office of Peat, Marwick, Mitchell and Co.

"All studies show that 20% of managers' time is spent on administrative trivia. We're saying you should bring down those tasks to a lower position," Shay said at the recent International Society of Wang Users' annual conference here. This formula answers the much-asked question of what secretaries will do when their duties are minimized through automation.

Although 85% of the Fortune 1,000 companies have a person or committee in charge of office automation, "one would have thought office automation would have grown faster than it has. [It hasn't grown] because there have been too many overlapping layers such as data processing, office automation and telecommunications," according to Shay.

One method to ensure office automation success is to install pilot projects quickly. "Don't do anything that takes more than three months," Shay said.

"We're recommending you start some high-visibility pilots and get the rhythm going. After that, start your long-range planning," he said.

This type of high-visibility pilot project will bring credibility to the office automation department.

Credibility can also be achieved by performing cost/benefit ratios, planning for business progress and planning for system integration, Shay continued.

Shay predicted that the successful implementation of office automation and the subsequent downgrading of tedious tasks could result in a productivity gain of 20% to 40%. "One of our clients is currently using a world class benchmarking program to drive his productivity engine," Shay said. "He has found that the five leading Japanese companies turn their inventories on the average of 14 times a year, and he is turning his four.

"Obviously, his company and America are never going to make the quantum leap to meet offshore competition by only improving at 7% or 10% a year," Shay said.

Local Net Helps Micros Share Files, Peripherals

DALLAS — Percom Data Corp. has introduced a local-area network to enable a number of microcomputers to share data files and peripheral devices.

The company's interface card, named Percomnet, carries a Western Digital Corp. WD2840 network control processor chip. The card is initially available for use with the IBM Personal Computer.

Equipped with a 64K-byte first-in first-out buffer, the network comes with token-passing protocol, up to 254 nodes, signal regeneration at each node and optional on-board encryption for data security. Percom said the network is compatible with Microsoft, Inc. MS-DOS; Digital Research, Inc. CP/M; and Unix operating systems.

The price is $595 a node. A three-node evaluation kit costs $1,695. The interface card is available from Percom Data at 11220 Pagemill Road, Dallas, Texas 75243.

Clear Definitions Lacking

Wang Users Given Portrait of DSS

By Jim Bartimo
CW Staff

BOSTON — "Decision support systems don't focus on decisions, they don't support you and they're not systems," Howard Morgan, chairman of the Advanced Office Concepts consulting group, told the International Society of Wang Users here recently.

Speaking at the group's annual conference, Morgan outlined what he believes a decision support system (DSS) should be and how it differs from what the management information systems (MIS)/data processing department offers.

In office automation, DSS provides the bookkeeping necessary to make better decisions. Unlike MIS, it need not concentrate as much on efficiency as effectiveness, according to Morgan.

This bookkeeping function can allow a business to cut down on its "bureaucratic ratio" — the ratio of how many calls occur internally before a decision can be made and communicated externally. The first step toward this bookkeeping function is the use of data bases, Morgan said.

Another important aspect of decision support is financial modeling, such as the type done with Visicorp's Visicalc electronic spreadsheet. Because each manager's DSS carries with it a bias from that manager's decision process, Morgan said, "the DSS life cycle is shorter than MIS. These systems should be disposable," he noted. Another weak area of DSS is the user interface. "Today's user interfaces are rude and arrogant," Morgan said.

System Forwards Messages

SUNNYVALE, Calif. — Candela Electronics has developed an office system that automatically forwards messages via a computer printer.

Called the Autotas Corporate Message Center system, it directs unanswered telephone calls to a central location where attendants can enter messages into the computer, a vendor spokesman said.

The system will accept and store up to 10,000 messages of as many as 255 characters on two 5M-byte hard disk drives. Messages are directed to 10½-oz. thermal printers, which print them out in 15-char. lines on 1½-in. paper.

Price ranges from $35,000 to $60,000. The system is available from Candela at 550 Del Rey Ave., Sunnyvale, Calif. 94008.

DEC Offers Winny Choice, Cuts WP Price

MAYNARD, Mass. — Digital Equipment Corp. has unveiled a 10M-byte Winchester disk option for its small business computer and has cut the price of the computer's word processing package by 9½%.

The 5¼-in. disk option, designated the RCD51-CA, boasts a storage capacity of 20,000 typed pages. It can be installed by users in the computer's existing system box, a vendor spokesman said.

Meanwhile, the word processing option to the Decmate II small business computer has been reduced to $995 from $1,100, the vendor said.

The package reportedly includes list/sort/math and communications bundled with Basic word processing software.

Price on the Winchester disk drive is reportedly $2,745. It is currently available with delivery time of four weeks from Digital at Maynard, Mass. 01754.

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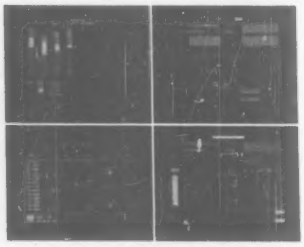
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Pansophic's Rise Spurred By Focus on Early Goals

By Paul Gillin
CW Staff

OAK BROOK, Ill.— If the potential for big profits and fast growth is the software industry's most alluring benefit, then time is its greatest enemy. Of the thousands of software packages that have come and gone over the past 25 years, barely a handful have been successfully marketed for more than 10 years. Even fewer have achieved a figure of more than 3,500 installations.

Pansophic Systems, Inc., a $43-million systems software supplier based here, claims two products in both elite categories. The company's Panvalet source program management and security system is now in its 14th year with more than 4,600 users, and its Easytrieve information retrieval package this year celebrates its 10th anniversary with more than 9,500 licensees, the company claims.

Meanwhile, Pansophic has maintained an average 30% growth rate over the last five years, performance it moved to continue in July with a $30-million stock offering. Although success this year was marred by legal headaches [see related story], Pansophic is poised to make some major acquisitions within the next 12 months, according to David J. Eskra, president and chief operating officer.



David Eskra — CW Photo by P. Gillin

"Acquisition is a key element in our marketing strategy," Eskra said. "Our business won't change, but we will look at segments of the business we haven't looked at."

Key to Pansophic's steady growth even during the recent recession is a focus on goals set forth as early as the founding year of 1969, Eskra said. "We have historically been involved in application tools geared toward the productivity of people

(Continued on Page 106)

Conduct Of Salesmen OK, Eskra Says

OAK BROOK, Ill.— "I'm sure some salesmen said some things they wish they didn't, but on the whole they conducted themselves well."

That is the opinion of David J. Eskra, president and chief operating officer of Pansophic Systems, Inc., following the resolution of a lawsuit filed in April against Pansophic by Future Software, Inc., a firm based in Salt Lake City, Utah [CW, April 18].

The $115 million suit against Pansophic and SGT Corp. was dropped late last month after Pansophic acquired Future Software's marketing rights to SGT, a CICS program development tool. Pansophic paid Future Software an estimated $1 million to drop the suit [CW, Sept. 5].

Pansophic had paid $2.4 million for SGT, which it renamed Gener/OL, in 1982. In doing so, it also took over responsibilities for a limited marketing agreement between SGT Corp. and Future Software.

Future Software charged that some Pansophic salesmen subsequently began using marketing tactics designed to dissuade customers from buying the SGT product from Future Software. One user contacted by *Computerworld* called the Pansophic tactics "Mafia-like."

"I said to my sales force, 'If you guys are using Mafia-like tactics, why are we losing customers?'" Eskra chided in a recent interview. "There was a lot of slurring that was going on for a variety of reasons. I think our salesmen are very, very good, and I encourage them to aggressively sell their products."

Silicon Valley Seen Beefing Up Security With Cooperative Effort

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — Computer manufacturers in California's highly competitive Silicon Valley have made great efforts to beef up their security in the last year, following a number of well-publicized trade thefts.

This is the impression gathered from recent interviews with a number of security specialists. The consensus is that companies are now far more willing to cooperate with one another over preventing the theft of trade secrets than they were even a short time ago.

"Many companies have upgraded their security, and there is more cohesiveness among both law enforcement agencies and companies themselves," commented Richard Camps, vice-president of Barrick Security Group, Inc., a San Mateo, Calif.-based private security and investigation firm.

Camps, who recently testified before the U.S. House of Representatives Subcommittee on Oversight and Investiga-

(Continued on Page 108)

Setting the Table; A High-Tech Sting

By Robert Batt
CW West Coast Bureau

SAN MATEO, Calif. — Richard Camps and Barry Bergman are old pros when it comes to the murky world of the so-called "sting operation."

From their modest one-story office here, 20 miles south of San Francisco, the two former narcotics police officers have established an extensive international network of informants and "operatives" who track the shady dealings of high-technol-

(Continued on Page 108)

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To Handle New Product Offerings

NCR Unveils Plan to Hire 500 Sales Reps by '84

By Bill Laberis
CW Staff

DAYTON, Ohio — Banking both on widespread customer acceptance of its new products and on a restructured sales and marketing organization, NCR Corp. has announced it will hire an additional 500 sales representatives by year's end.

A company spokesman declined to say by what factor the 500 new hires will increase NCR's sales force, except to state the increase is "very significant." It is believed the company's present sales force is comprised of about 7,500 people.

The Dayton-based computer maker has officially launched its sales recruiting drive, targeting college-level graduates in computer science and business-related fields. NCR has established job centers in major U.S. cities to aid in the hiring effort, dubbed "Opportunity '83."

"We are looking for college graduates with a demonstrated high level of academic achievement," said Paul W. Lappetito, senior vice-president of NCR's U.S. Data Processing Group. Lappetito said that candidates favorably interviewed at the job centers will be made same-day offers, then placed in a six-month training program at the company's educational facilities.

Unlike most of its competitors in the non-IBM mainframe world, NCR managed to sail through the recession in reasonably good shape. Sales in 1982 increased 3% to $3.5 billion, while profits rose 13% to $234 million or $8.75 per share. The company's performance has continued strong into 1983, with profits in its most recent quarter up 16% to $69 million on a 7% increase in sales to $932 million.

Asset Management Emphasis

The recent financial results reflect in part a business strategy hatched in 1981 to reduce equipment inventories, improve manufacturing and, in general, gain better control over costs. This strategy continued into 1982, as the company placed further emphasis on asset management.

This strategy also saw the company breach new market areas. In 1981, the company announced its entrance into the semiconductor market, and late last year a subsidiary, NCR Comten, Inc., announced the capability of making its front-end processors compatible with Digital Equipment Corp.'s computers.

In May the company entered the telecommunications services market by forming NCR Telecommunications Services, Inc. And in a joint effort with Intel Corp., NCR developed a system to transmit data among computer terminals which is cheaper but slower than Xerox Corp.'s Ethernet, according to Newton-Evans Research Co., a Sykesville, Md. industry research firm.

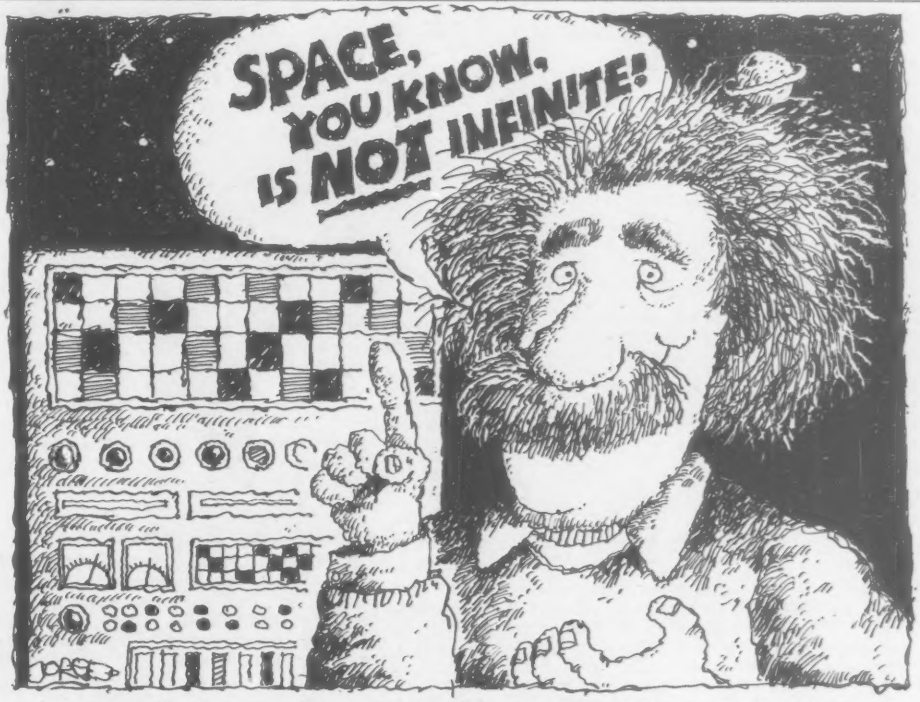
On the marketing front, NCR this fiscal year announced a restructuring of its sales force, whereby at least one vertical market will be included in each of the company's three marketing groups. This system replaces a structure based around geographical territories. The restructure also created the Customer Services Division, providing hardware and software support to NCR's installed base.

'NCR is doing much better these days because they are doing better market research, then responding with product development efforts. They are also focusing more on retailing, their greatest strength.'
— Charles Newton, president Newton-Evans Research.

But it is to market the plethora of new product introductions announced in the last 24 months that the new sales people will be concerned with. The company is replacing its entire line of V-8500 M and MP computer systems with the 8600 series, targeting NCR's traditional strengths in transaction processing. Seven new models in this line were announced last May.

In the beginning of fiscal 1983, the company entered the personal computer market with its Decision Mate V series, designed around industry standard hardware and software subsystems for business and professional users. The Decision Net local-area network was also announced in conjunction with NCR's micro thrust.

"I'd say their microcomputer focus has to be one of NCR's strong suits at this time, particularly in the vertical markets where NCR is very strong," said Charles Newton, president of Newton-Evans Research. "There are problems with profitability in the low end, although the company has a sizable installed base in which to sell its new [microcomputer] products." At the high end, NCR this year introduced a 32-bit mainframe based on its very large-scale integration technology, the 9300 series.



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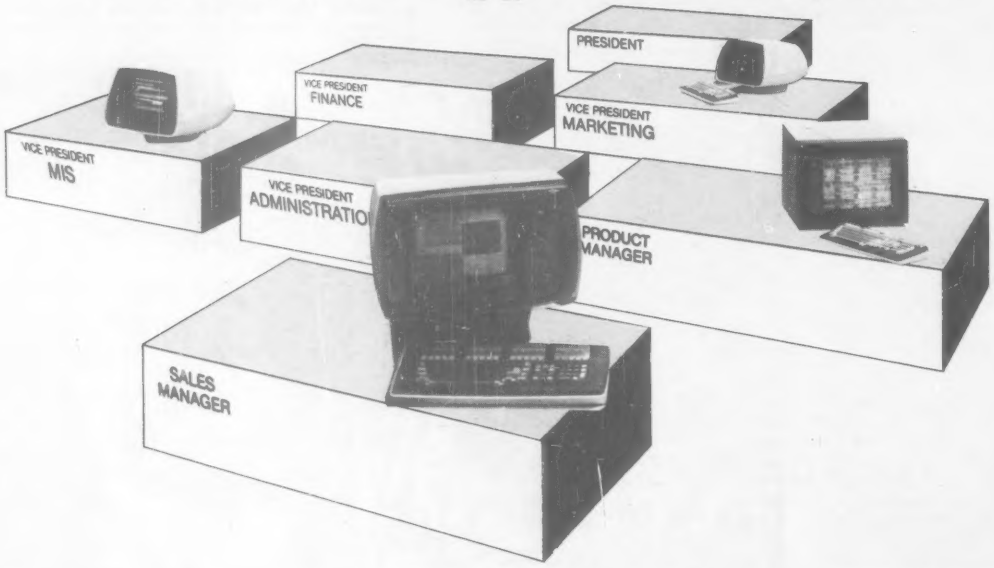
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Mass. Bill Would Protect Intangible Material

By Peter Bartolik
CW Staff

BOSTON — A law to extend trade-secret protections to intangible material has received initial approval from the Massachusetts House of Representatives here.

The legislation would broaden a law enacted in 1967 that was aimed at protecting trade secrets but was limited to tangible or physical materials. The new bill was filed by Rep. W. Paul White (D-Boston) on behalf of the Associated Industries of Massachusetts (AIM), a cross-industry lobbying group and sponsor of the original law.

"This would not stymie employee mobility," AIM General Counsel William J. McCarthy told *Computerworld* in a recent interview. "There are many steps and criteria a company must follow before the law can be invoked," he added.

Essentially, the bill would extend to intangible material the three remedies currently provided companies for protection of tangible trade secrets. Those remedies, according to McCarthy, are: provision for a criminal charge of larceny; civil court action providing for the awarding of double monetary damages; and the ability to seek injunctive relief from a judge.

McCarthy said the legislation would codify a decade's worth of case law handed down by this state's top court, the Supreme Judicial Court. That court, he added, has established various procedures that must be followed by companies to ensure that employees are aware that materials are the property of the employer.

Computer law expert Robert Bigelow, a partner in the Woburn, Mass., firm of Bigelow and Saltzberg, said the determination of whether intangible materials actually belong to an employer or employee would depend on the manner of their working arrangement.

"Generally, the inventions of an employee who is hired to invent and that fall within the scope of the company's business belong to the company," Bigelow said last week. "The inventions of an employee developed on his own time and in an area not within the company's business will belong to the employee."

However, he noted, there is "a middle ground" where an employee develops an idea on his own time but within the scope of his employer's business. "That sort of balances to the employer if [the individual] is an inventing employee," Bigelow said, adding that many companies require their employees to sign agreements specifying employer rights.

People leaving an employer to start up their own firms should check with a lawyer "to find out what the rules are," Bigelow said. Legal advice is useful both to determine who owns the rights to ideas and to determine if an employer-employee agreement is proper and legally enforceable, he said, adding that some agreements go beyond the law and can be either restricted or tossed out by a judge.

AIM's McCarthy said the law's protection is not limited to high-technology industry. "There has been a tremendous surge in valuable research and development activity in Massachusetts, not only in high tech, but in the more mature industries as well," he said.

The bill faces two more votes before the House before it can be sent to the state Senate.

Wang Labs Sells Its 4.3% Stake In Tymshare

LOWELL, Mass. — Ending speculation that an unfriendly takeover was in the works, Wang Laboratories, Inc. this month sold its 4.3% stake in Tymshare, Inc., canceling previously announced plans to acquire a larger stake in the value-added communications reseller.

The sale of some 531,000 shares of Tymshare was followed by another announcement of a $10 million agreement with the packet-switching firm of Bolt, Beranek and Newman of Cambridge, Mass., whereby Bolt will design and install a wide-area network built around its latest packet-switching technology.

Beyond initial usage of the wide-area network in the company's internal management information requirements, Wang said it plans to expand this capability in the future to provide value-added communications services to its customers. It was this capability that some analysts speculated Wang sought with the purchase of Tymshare stock.



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Know Limitations and Goals, Pansophic Exec Advises

OAK BROOK, Ill. — The key to navigating a small software company successfully through the choppy waters of competitive business is to know your limitations and your goals equally well.

That is the advice of David J. Eskra, president and chief operating officer of Pansophic Systems, Inc., a $43 million systems software firm based here. Formed in 1969 with four employees and $100,000 in financial support, Pansophic today employs 430 people and is one of the top 10 money-makers among independent software vendors.

The company has achieved impressive growth and profit figures while pursuing markets that were defined in the very early days of its existence, Eskra said. That philosophy of doing one thing well has become paramount for small companies as the software market has become more crowded, he noted.

Asked to identify the key ingredients in Pansophic's success, Eskra cited the "vision and stubbornness" of Pansophic founder and chairman Joseph A. Piscopo, who started Pansophic at the age of 23. "He's very single-purposed in his mind set and he has never changed his belief that products like Panvalet and Easytrieve would satisfy a demand," Eskra said. "You'll find that what it takes to sell Panvalet today really hasn't changed that much" from 13 years ago.

To get a software company moving today requires "a real firm idea of what you want to do" and a knowledge of the skills that got you to the first stage of success, Eskra said. Equally important is "not to think that because you sell one kind of software you can sell all kinds of software," the Pansophic president said. "If you're a salesman, don't try to be a technician, and if you're a technician don't try to be a salesman."

But when the chance to grow comes along, don't be afraid to explore new avenues, Eskra said. If building a business isn't your lifelong goal, Eskra offered another alternative. "Develop a great product, and call me," he said.

Pansophic's Products Survive Test of Time

(Continued from Page 101)

who interact with computers, whether end-users or programmers," he said. "We define ourselves as an application development systems vendor."

Eskra, whose Mercedes Benz sports an "EZT" license plate in deference to the company's most popular product, said that the company has strayed little from the intentions set forth in those early years. Following an aborted foray into packaged applications with Panrisk, introduced in 1980, and flirtations with consulting, Pansophic is now seeking to strengthen its grip on the application development field. Last year it acquired three products: O-W-L (On-Line Without Limits), a design, development and library management system; MIS/OL (Management Information Systems/On-Line), a source program development and maintenance tool; and Gener/OL (Generation/On-Line), an end-user-oriented IBM CICS application generator.

In some cases the new products compete with current Pansophic batch offerings, but the on-line distinction is an important one, Eskra said. "Last year we went from 0% to 5% [of revenues] in on-line products compared to a plan of 3.5%," Eskra said. "Easytrieve [a batch product] revenues are stabilizing now, which we knew would happen. But on-line has created a new level of demand."

The software industry has answered that demand with a bevy of products that promises to ease the programming burden by generating code and off-loading some applications programming to users. The industry has also seen a flurry of activity in the area of user-friendly relational data base management systems (DBMS) and in tools linking microcomputers to mainframes. In response, Pansophic is again taking a hard look at products that fall outside its traditional areas of expertise, but only at those that "have a high perception in the market," Eskra said.

A Pansophic DBMS, "is not out of our realm of thinking," he noted.

However, Pansophic has no plans to enter actively into the micro software market, Eskra emphasized. "We don't think [IBM Personal Computer] capability will get people to buy Pansophic because they can get essentially the same capability [on our products] with an intelligent [IBM] 3270 terminal," he said.

"We will have Pansophic products operating on [Personal Computers] and try to develop a technical link to the mainframe," he said. "The [Personal Computer] today is a single-purpose acquisition that people buy because they want to get to a little piece of data. Our business is big corporate data bases."



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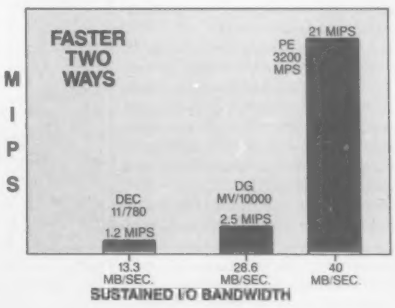
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PERKIN-ELMER

Undercover Duo Stings High-Tech Gangsters

(Continued from Page 101)

ogy gangsters.

Concentrating, in particular, on the "gray" market, so-called because it combines both legitimate and illegal trading in semiconductor devices, Camps and Bergman conduct undercover sting operations for clients in which they sell purportedly stolen goods to suspected thieves in a bid to draw out the ring leaders.

The sources include regular business contacts, law enforcement agencies and even members of the underworld.

"Our job is to identify the perpetrator. We prefer to work on the outside of a company first, and often we use a plant operative who can supply inside information and send it back to us. Our aim is to find out who is financing the illegal activity," explained Bergman, who declined to be photographed.

Having identified the culprit, Camps and Bergman then pose as criminals dealing in stolen merchandise.

Camps recently told a House of Representatives subcommittee: "The trade in stolen electronic merchandise is both extensive and lucrative. There are sophisticated national and international networks involved in this activity, and there are several electronics companies in northern California that are generally considered to be fronts for the Soviet Bloc countries."

The distribution network, he told the congressmen, is the key element in this market. Without this link, he asserted, the thieves would find it very difficult to dispose of stolen goods, and buyers would be very hesitant to deal directly with the suppliers.

Camps described to the committee a recent case in which a south San Francisco businessman named Barry Ching-bor Poon was arrested for dealing in stolen integrated circuits. When arrested, Camps said, police found Poon's residence literally crammed with 75,000 integrated circuits valued at between $200,000 and $300,000. Camps and Bergman had sold many of these chips to the alleged thief as part of an undercover operation.

The chips, Camps claimed, were due to be shipped to Poon's brother in Hong Kong, where they were targeted for sale to manufacturers of counterfeit Apple Computer, Inc. personal computers. As part of the sting, the two agents negotiated with Poon and his brother for the importation from Hong Kong of large quantities of counterfeit Apples.

"In exchange for a preferential price and the promise of a steady supply of chips in the future, the Poons offered us a good deal on the counterfeit Apples — $300 per unit delivered," Camps told the committee.

These facts, said Camps, suggest that Poon was part of a network that purchased stolen chips in California, shipped them to Asia for use by counterfeiters of Apple and other computers and assisted the sales and distribution of the counterfeit merchandise back in the United States.

Silicon Valley Beefing Up Security Steps

(Continued from Page 101)

tions, said computer manufacturers are now more willing than they used to be to prosecute the theft of proprietary information or hardware.

"High technology firms are becoming increasingly aware of the potential damage that a breach of security can do to their business. As a result they are becoming more unified in creating and enforcing laws in partnership with other companies or government agencies," said Douglas Southard, supervising attorney for the District Attorney's Technology Theft Association (Data), in Santa Clara, Calif.

As an example, Southard cited the recent lobbying of Congress by the major semiconductor manufacturers for copyright protection in the design of integrated circuits. "It was only a few years ago that the major companies were at loggerheads with each other over this issue," Southard recalled. "Now they realize it is in their enlightened self-interest to have this kind of security."

Data, an association comprising 25 detectives from local police forces, the Federal Bureau of Investigation, U.S. Customs Service and the Santa Clara County Sheriff's Office, specializes in tracking down criminals working in areas such as stolen chips and trade-secrets theft.

According to Southard, there appears to have been a significant drop in the number of thefts in hardware components such as integrated circuits, disk drives and diskettes.

"The theft of proprietary information is our main problem now," Camps observed. Closer screening of personnel, more stringent verification of previous employment and a tighter check on employee resumes will help to reduce trade-secrets thefts, he said.

Camps, a former intelligence officer in Latin America with the Drug Enforcement Administration, said the weakest point in a computer manufacturer's security is its people.

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Aimed at Regulating Business Relations

Dealers, Suppliers Contest Terms of Legislation

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Representatives of computer and office equipment manufacturers squared off against business equipment dealer spokesmen at recent Senate hearings on legislation to regulate business between the two groups.

The proposed legislation, the Office Machine and Equipment Dealers Act, prescribes "good-faith" business practices the manufacturers must follow and sets termination procedures for dealer contracts. Its sponsors contend it will limit abusive and unfair treatment of the usually small dealer organizations by the often large and powerful manufacturers.

'The bill "would effectively remove the threat to dealers of large, primarily foreign suppliers, whose predatory actions have been responsible for countless bankruptcies and financial loss in this high-tech, service-oriented industry."'

— Sen. James J. Exxon

Sen. James J. Exxon (D-Neb.), who introduced the bill early this year, said it "would effectively remove the threat to dealers of large, primarily foreign suppliers, whose predatory actions have been responsible for countless bankruptcies and financial loss in this high-tech, service-oriented industry."

During the Sept. 14 hearing of the Senate Commerce, Science and Transportation Subcommittee on Consumer, Exxon said the legislation was aimed at foreign firms, but for legal purposes, it had to be written to include all equipment manufacturers. He also emphasized that the bill, in mandating fair and equitable contracts for dealers, does not include any provision for federal oversight of such contracts.

A parade of equipment dealers and their representatives urged congressional passage of the legislation. Richard P. Nelson, president of Ohio Business Machines, Inc., Cleveland, and a member of the National Office Machine Dealers Association (Nomda), complained of "the manufacturer's dictatorial power over dealers." According to the dealers, the greatest problems involve foreign — particularly Japanese — suppliers.

The situation has developed, several people said, because the Japanese have become such dominant suppliers of business and office equipment. Nomda President John J. Kuchta told the subcommittee that dependence on foreign products without alternative sources of supply has resulted in these manufacturers acquiring inordinate bargaining power.

"Despite several years of attempted negotiation with the 'source of power,'" he continued, "one-sided dealer agreements are still offered on a 'take it or leave it' basis, unfair quotes are still being set and product performance is still poor. It seems that the response of these foreign suppliers is clear: They have the power to dictate the terms of their relationships with dealers and plan to continue to do so."

Representatives of U.S. manufacturers, however, argued the bill is unnecessary because existing contract law is sufficient to protect dealers, because the bill is so vaguely worded that it will result in excessive litigation and because the dealers' problems are limited and thus do not require legislative redress.

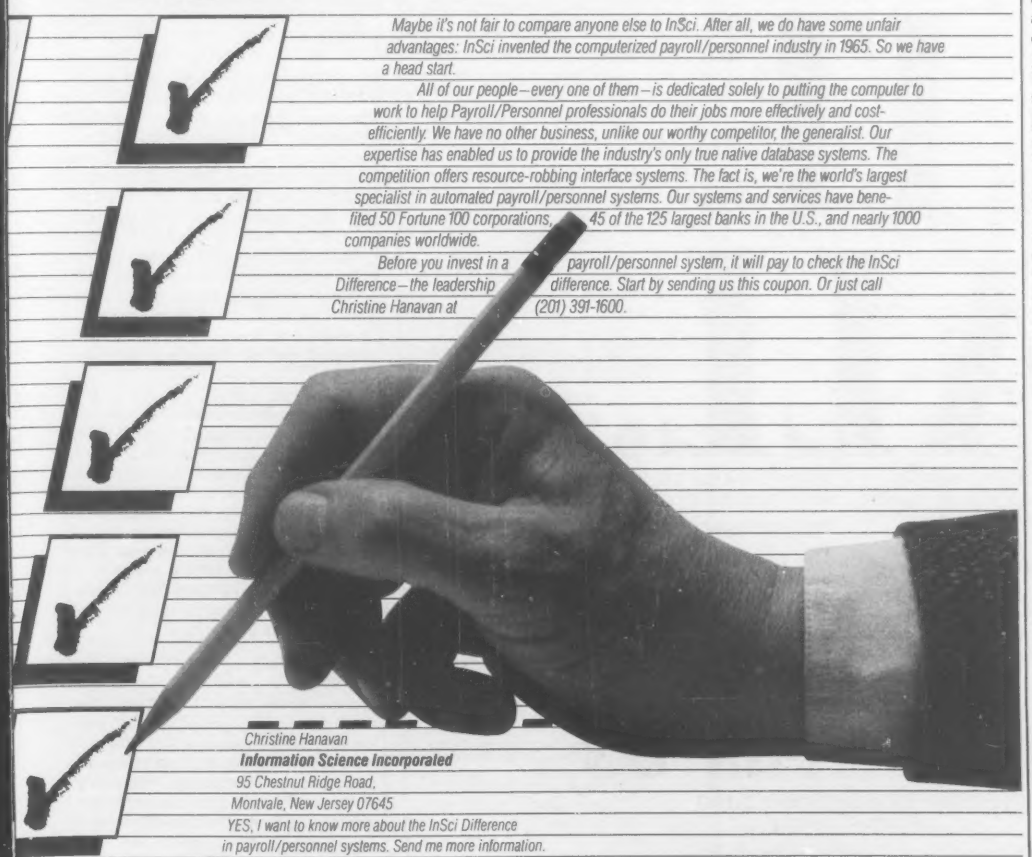
IBM Vice-President Terry Lautenbach said the bill "assigns very generous rights to office equipment dealers and places very onerous responsibilities on office equipment suppliers without spelling out the rights or duties of either one very cleary." He added that the bill would be anticompetitive.

Similarly, Jack Biddle, president of the Computer and Communications Industry Association, said the bill "would lead to further erosion of America's world leadership position in high-technology products. It would deny U.S. consumers the freedom of choice in product selection they now enjoy and would force them to pay higher prices for those products which they could purchase."

The bill was also opposed by the Consumers Union, the Coalition for Competition and, very strongly, by the Federal Trade Commission (FTC). FTC Commissioner George W. Douglas said that because existing law "more than adequately protects dealers" and because the bill "may be anticompetitive ... there is no sound basis for enacting this legislation."

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Supershorts

Nippon Telegraph and Telephone Public Corp. (NTT) is now accepting applications from U.S. companies for the research and development of digital subscriber loop multiplexing and transmission equipment. NTT is seeking equipment that multiplexes up to 64 digital subscriber circuits per system and connects them to a digital local switching system through a 6.3M bit/sec digital transmission line.

* * *

Anacomp, Inc. has announced an agreement to provide transaction switching and processing services for the Michigan-based Magic Line shared electronic funds transfer network beginning in early 1984.

* * *

The Business and Consumer Communications Division of **ITT Telecom Products Corp.** has been awarded a contract to supply multiline key telephone systems and single-line telephone sets to Pactel Communications Systems, a subsidiary of the Pacific Telesis Group. The value of the contract was not disclosed.

* * *

Altos Computer Systems, Inc. has introduced Altos Express, a support program for Altos dealers that includes sales leads, analysis of competitive equipment, hardware and software descriptions and product and price updates.

* * *

Wang Laboratories, Inc. will manufacture its Professional Computer microcomputer line for the European market at its new plant on the Stirling University campus in Scotland. The first phase of the plant includes 5,000 sq ft of production facilities. Construction of an additional 125,000 sq ft will begin next year, and when fully operational, the plant will employ about 700 people.

* * *

Digital Equipment Corp. and **Scientific Calculations, Inc.** will cooperatively market Scientific Calculations' Microelectronics Design System (Meds) software on DEC's VAX-11 32-bit superminicomputers. Developed for designers of very large-scale integration (VLSI) circuits, Meds automates the layout of gate arrays, cell-based integrated circuit designs and fully customized VSLI.

* * *

IBM has announced a new authorization program that permits qualified retail software stores to sell IBM Personal Computer software, expanding the availability of software for the IBM Personal Computer and the Personal Computer XT. Previously, only authorized IBM Personal Computer retail dealers, IBM Product Centers and IBM marketing representatives could sell the software. As part of the program, several locations of Software Centers International have been designated authorized Personal Computer software dealers.

* * *

Dataproducts Corp. has consolidated two divisions, Integral Data Systems, headquartered in Milford, N.H., and the Serial Printer Division, based in San Jose, Calif., into a new organization — SPG. August P. Klein, formerly president and chief executive officer of Integral Data Systems will head SPG as group vice-president. Integral Data Systems became a wholly owned subsidiary of Dataproducts in April.

* * *

Harris Corp. plans to build a new 230,000 sq-ft plant in Malabar, Fla. Ground breaking for the $20-million facility is scheduled for the fall, and construction should be completed a year later. The Malabar plant will be used for manufacturing, assembling and testing advanced information processing and communication systems for the U.S. government. The first systems to be transferred to Malabar will include the Harris Emux (electrical multiplexer) system for the B-1 bomber and GMF (ground mobile forces) satellite terminals for the U.S. Army.

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Trilogy Story Shows Risks of Start-Up Efforts

By Robert Batt
CW West Coast Bureau

CUPERTINO, Calif.— The recent announcement by Trilogy Ltd. that it is seeking public financing two years before its first product goes to market underscores the risks involved in developing a new technology through a start-up enterprise.

This is the common response of industry analysts and Trilogy officials alike to the company's plan to offer six million common shares on the open market at between $12 and $15 per share, thereby reaping between $72 million and $90 million.

"The market is still relatively buoyant, and although Trilogy has raised a lot of money in private financing, it is spending it very quickly, particularly on research and development. The only way it can raise the money it needs is to go public," commented Greg Kelsey, senior technical analyst at the San Francisco investment firm of Hambrecht and Quist.

License Deals

Trilogy, founded by ex-Amdahl Corp. chairman, Gene Amdahl, and his son, Carlton, recently raised $77 million through deals to license its technology with Digital Equipment Corp., Sperry Corp. and CII-Honeywell Bull of France. However, noted Kelsey, a former financial officer at Amdahl, there is a limit to how much of this kind of financing a new company can obtain without giving control away to other stockholders.

Trilogy was set up in 1981 to develop new semiconductor, packaging and computer-aided design technologies to be incorporated in a large-scale, IBM-compatible computer system. In its prospectus announcing the proposal to offer public stock, Trilogy claimed this technology includes an advanced bipolar semiconductor design and fabrication process, which will result in wafer-scale integrated circuit devices containing approximately 30 times the number of circuits available in current state-of-the-art devices.

"What Trilogy is attempting to do is a radical departure from current technology. When you are embarking on something unknown like this, development costs are difficult to estimate, and it could require anywhere between $300 million and $600 million to pull it off," said John Fram, securities analyst at Paine Webber, Mitchell Hutchins in New York.

According to Tom Lerone, Trilogy's vice-president and treasurer, the company will ship its first product sometime in 1985, but he backed away from an earlier prediction that it would be in the first half of that year. Nevertheless, prospective stockholders are taking a risk in putting their money in Trilogy, as the company's prospectus makes clear:

"The computer design is still under development, and significant advances beyond the current state of the art must be achieved in all product development areas to complete the effort successfully. There is substantial risk of schedule delays, and there can be no assurance that the development effort will be successfully completed," it stated.

According to Kelsey, greater than expected development costs and schedule delays are to be anticipated when researching a complex new product. Costs, he explained, are a function of how long it takes to bring a product to market.

"If costs overrun and the product is delayed, Trilogy may need to make additional stock offerings, which could dilute the value of existing shares. This would be the one drawback I could see to investing in the company," Fram added.

Analysis

'What Trilogy is attempting to do is a radical departure from current technology. When you are embarking on something unknown like this . . . it could require anywhere between $300 million and $600 million to pull it off.'
John Fram, securities analyst at Paine Webber, Mitchell Hutchins.

Datapoint Profits Show Gain, Mostly From Fourth Quarter

SAN ANTONIO, Texas — Citing strong domestic sales of its office products and computers, Datapoint Corp. has posted year-end profits of just over $8 million, or 40 cents per share, up from last year's earnings of $2.4 million. More than half the company's earnings were gained in the fourth quarter, which ended July 31.

Revenues were up 6% to $540 million for the year, the company reported. Sales in the fourth quarter dipped slightly to $137.5 million compared with $140 million the same period a year ago, but profits totaled $4.3 million compared with $3.3 million.

Commenting on the company's performance, Harold O'Kelley, chairman and chief executive officer, said, "Fourth-quarter operations were affected by several nonrecurring events, including the divestiture of the Communications Management Products Division and sale of the company's Denmark subsidiary. . . . We have strengthened our senior management ranks, improved our financial condition, sold the telecommunications operations and tightened our focus on office and computer products."

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Cullinet Shareholders Vote To Change Name at Meeting

BOSTON — Cullinet Software, Inc.'s annual meeting earlier this month could not have been a cheerier gathering.

Chiefs of the self-described "product-rich" software company not only assured a packed auditorium of shareholders and market analysts of brimming coffers, but also got off some well-aimed shots at IBM as well.

In official business that lasted no longer than five minutes, John Cullinane, chairman of the board and chief executive officer, presided over a unanimous shareholder vote to change the company name from Cullinane Data Base Systems, Inc. to Cullinet Software, Inc. Also approved was an increase in the authorized number of common shares from 20 million to 80 million.

Earnings Announced

Cullinet, which became a publicly traded company five years ago, has more than $44 million in cash and marketable securities and earned $11.6 million on revenue of $78.6 million in fiscal 1983.

According to Cullinane, his software company is "product-rich" with $1.6 million in software products that he claims run the full gamut of available software.

On April 19 of this year, Cullinet announced a three-tiered product which the company claims offers "the full solution" to software needs:

- A relational data base management system called IDMS-Relational, said to combine network and relational architectures in one system.
- A mainframe-based information data base, said to provide access to mainframe data for personal computer users.
- A data base-driven application software system for IBM Personal Computers.

Beta Testing Slated

The product is scheduled to enter beta testing this December and will be available "probably four months after testing," according to Robert Goldman, Cullinet's president.

Calling IBM's recent introduction of Database 2 relational data base management system "modest and far out" and labeling the computer giant "a marketing myopia," Cullinane announced that he could not have been more pleased with the announcement.

"From our perspective, it was a great announcement," he said of the product, which is scheduled for general availability in the third quarter of 1984.

Bank of Boston Announces Pact With Mellon

BOSTON — The Bank of Boston has announced an agreement with the Mellon Bank whereby Mellon would assume the data processing services that Bank of Boston now provides to some 100 correspondent banking customers in the Northeast.

Under the agreement, Bank of Boston correspondents electing to use Mellon's DP services would be converted during the next several months, the bank said. Bank of Boston's decision to discontinue the service followed a strategic analysis of that end of its business.

"The number of banks in the New England region that continue to purchase data processing services from outside sources is declining steadily, due in part to increasing merger and acquisition activity," a Bank of Boston spokesman said. "It is becoming increasingly apparent that to be competitive as a provider of correspondent bank data processing services, one must have significant volumes on a national basis to achieve necessary economies of scale."

Facsimile Mart Will Expand, Study Predicts

SAN JOSE, Calif. — Despite a trend toward integration of facsimile equipment with other information networks, the market for stand-alone dedicated facsimile terminals will continue to grow at an annual rate of 16.4%, reaching $1.7 billion by 1987, according to an analysis by Creative Strategies International (CSI).

According to "The U.S. Facsimile Market," analog devices that presently comprise 70% of installed units will experience an eroding market and drop to 30% in 1987 as the trend to replace them with less expensive digital terminals gains momentum.

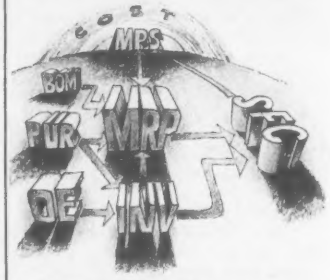
CSI, a subsidiary of Business International Corp., said that facsimile equipment will follow the lead of word processing and data processing toward incorporation into multifunctional information processing systems with communications ability.

Japanese corporations will continue to dominate manufacturing in the industry, but "major American competitors have distribution agreements with Japanese manufacturers, enabling American firms to take advantage of Japanese efficiencies in manufacture," CSI said, adding that OEM arrangements will proliferate.

"IBM may have a major impact on the perception of facsimile as a function in the broader context of data communications," CSI said, citing IBM's entrance into the market with the Scanmaster I nondedicated terminal that also functions as a data output printer and convenience copier.

The report, which includes company profiles and market share data, is available for $1,450 from Creative Strategies International, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

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Philadelphia, PA	Sept. 28
Phoenix, AZ	Oct. 12
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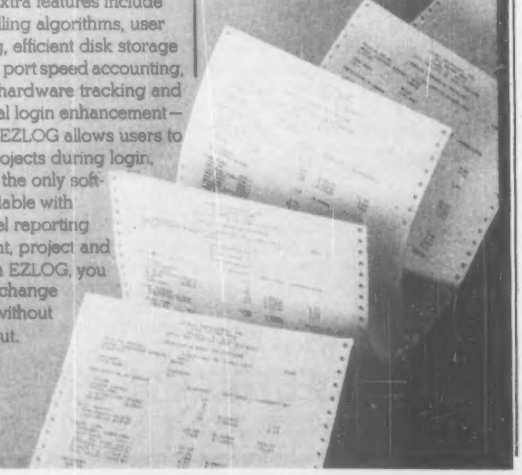
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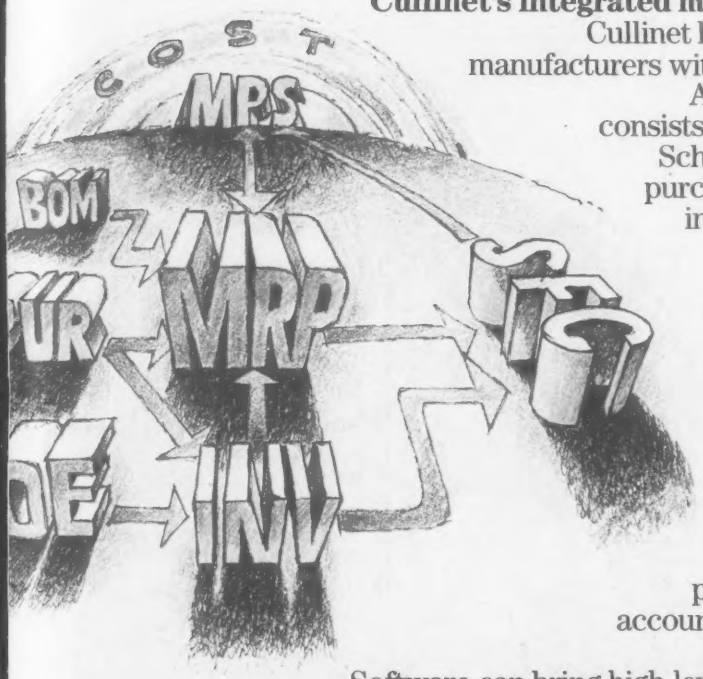
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For more information or to attend a seminar on Cullinet's Manufacturing Software, see the page adjacent.

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AT&T to Close Another Western Electric Plant

NEW YORK — Continuing to shed chunks of monopoly fat in preparation for court-ordered divestiture, AT&T said this month it will close yet another manufacturing plant operated by Western Electric, AT&T's equipment manufacturing wing.

The company will shut the doors of its 33-year-old Indianapolis facility by early 1986, affecting some 3,700 people currently working there. A Western Electric spokesman said some of the workers will be laid off, some transferred and others retired. The Indianapolis plant produces telephones and communications components, primarily.

The recent announcement is the fourth such facility phaseout hatched since the beginning of the year. Plants at Kearny, N.J., Cicero, Ill., and Baltimore will also be shut, affecting about 10% or 14,200 of Western Electric's work force of 132,000.

Further, more announcements of partial or total closings are expected before the year's end, as AT&T completes a plant consolidation program. At present almost 40% of the plant capacity at Western Electric's 21 facilities is idle, the spokesman said.

The closings mirror the impact of Western Electric's imminent loss of the Bell operating companies as a captive market once divestiture takes place. Most of the operations curtailed by the announced plant closings involve the manufacture of customer premises equipment, such as telephones, which next year the operating companies will be free to purchase from any vendor.

Western Electric has also taken a pounding in the domestic private branch exchange (PBX) market. Its market share of the large-scale PBX market, for example, fell from 60% in 1980 to 29% two years later, according to Northern Business Information, a New York-based research firm.

Honeywell Inks Agreement With Drexler for Laser Cards

MOUNTAIN VIEW, Calif. — Honeywell, Inc. has signed a licensing agreement with Drexler Technology Corp. for laser card equipment, whereby Drexler grants worldwide rights to patents, technology and the designs to four prototype devices for using Drexon laser memory cards.

The cards, which optically store up to 16M bytes of data on a medium the size of a credit card, compete against floppy disks and semiconductor storage devices on the basis of capacity and price per unit of storage. Formatted Drexon cards for laser recording up to 2M bytes are priced at $1.50 each when purchased in volume, Drexler said.

The cards are designed for a range of applications, including office automation, data distribution, banking and sales transactions, medical records and personal computer software loading and distribution.

Honeywell becomes the tenth vendor to license Drexler's laser card equipment, joining NCR Corp.; Wang Laboratories, Inc.; Ericsson Information Systems; and several Japanese companies.

Plexus Signs $40 Million Pact With Philips

SANTA CLARA, Calif. — Plexus Computers, Inc. has signed a three-year, $40 million pact with Philips Information Systems, Inc. for the delivery of 32-bit supermicrocomputers.

Under the agreement, Philips will purchase the Plexus P/35 system, a 32-bit tabletop microcomputer, and the P/60, said to support up to 40 users and based on Plexus' proprietary multiprocessor architecture.

The contract also covers future supermicrocomputer systems under development by Plexus, as well as board-level products, the firm said.

Philips will purchase the systems for use as shared resource and network processors in its future office automation products, a spokesman said. The company's European operations may also purchase Plexus equipment for use in turnkey vertical market systems.

Facing Losses, Victor Trims Staff by 500

SCOTTS VALLEY, Calif. — For the third time in two months, Victor Technologies, Inc. is paring its work force, this time by some 500 employees, in the face of heavy losses.

The layoff will reduce Victor's work force to 1,500, less than half the number employed in August. Victor has also instituted a series of consolidation moves designed in large part to control costs.

Victor lost $11 million in the second quarter, soon after the personal computer maker went public.

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Softcon Trade Fair Slated For Feb. 21 in New Orleans

NEW ORLEANS — Softcon, an international conference and trade fair for the software industry, will be held here at the Louisiana Superdome Feb. 21-23. It will feature approximately 800 booths and more than 100 seminars, panel discussions, conferences and workshops.

The conference is aimed at retailers, wholesalers, independent sales organizations, consultants, Fortune 1,300 buyers, government agencies, volume buyers, educational institutions, software professionals and software developers.

Registration is $30 for an exhibits-only badge and $195 for the full conference. Further information is available from Northeast Exposition, 822 Boylston St., Chestnut Hill, Mass. 01267.

Software Testing Service Offered

BEVERLY, Mass. — Duncan Associates has announced the availability of Contract/QA, a software testing service said to provide software developers with a cost-effective approach to delivery of high-quality application software.

The service is reportedly based on a standardized approach to quality assurance and includes both software testing and an assessment of user and technical documentation. Software testing procedures include pretest definition of expected results, full edit testing, case testing and written documentation of all bugs found, the company said.

Further information is available from 108 Lothrop St., Beverly, Mass. 01915.

Executive Corner

• **John MacDonald** has been appointed president of Northern Telecom Finance Corp., a subsidiary of Northern Telecom, Inc.

• **Howard A. Thrailkill** has been named president of Four-Phase Systems, Inc. and appointed vice-president of Motorola, Inc.'s Information Systems Group.

• **H. Glen Haney** has been named president and chief executive officer of Micropro International Corp., and **Seymour I. Rubenstein** has been appointed chairman of the board of directors.

• **Barry N. Yarkoni** has been appointed vice-president of marketing, and **Micheal A. Lento** has been named vice-president of operations at Business and Professional Software, Inc.

• **Anthony L. Craig** has been appointed vice-president, international sales integration, at General Electric Information Services Co.

• **William J. Gunter** has been elected vice-president and treasurer of United Telecommunications, Inc.

• **Felix J. E. Rosengarten** has been elected a vice-president of American Microsystems, Inc. and named general manager of Asahi Microsystems, Inc., which is American Microsystem's joint venture in Japan.

• **Gerald D. Knudson** has been appointed vice-president of sales at Calma Co.

• **James R. Oyler** has been appointed vice-president and general manager of Harris Corp.'s Computer Systems Division, replacing Howard A. Thrailkill, who has left Harris to join Four-Phase Systems, Inc.



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Beyond Incremental Improvements

MCC Finalizes Plans for $350 Million in R&D

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Microelectronics and Computer Technology Corp. (MCC), the 13-firm joint research and development venture pioneered by Control Data Corp. Chairman William Norris, has finalized plans for almost $350 million in initial R&D, according to the organization's technical director.

Thomas F. Gannon, on loan to MCC from Digital Equipment Corp., where he is technical director of DEC's Technology Development Program, told the Federal Computer Conference here recently that like other advanced R&D projects around the world, MCC's work is "not targeted for incrementally improving current technology."

Instead, MCC's four initial projects, involving very large-scale integration (VLSI), software technology and systems architectures, are aimed at producing major breakthroughs in the development of specific systems for selected applications.

This approach, he noted, is "a drastic change" from the historic trend of concentrating on orderly advancement of general-purpose computing.

He pointed out that Japan, France and the UK are all developing projects aimed at accelerating the rate of technology development to leapfrog current industrial trends. Their actions have been countered in the U.S. by projects under the auspices of the Defense Department's Advanced Research Projects Agency, the Energy Department and the National Science Foundation, as well as by the joint venture Semiconductor Research Corp.

MCC, currently establishing headquarters in Austin, Texas, is gearing up its four R&D projects, Gannon said.

The first, called "Alpha-Omega," is aimed at developing advanced computer systems architectures to support knowledge-based expert systems used in data base modules, human interface systems and parallel computations with performance levels exceeding current levels by several orders of magnitude, he said. The project will run for 10 years at $15 million a year with 85 professional and support personnel involved.

The software technology project, he said, is designed to "increase the productivity of the overall software development process for both software and nonsoftware professionals."

Access to computers in the 1990 time frame will be so widespread, according to Gannon, that software will have to be developed that can be used by anybody, particularly those who are unable to write even a single line of code.

He pointed to Vicicorp's Visicalc and similar software packages as precursors of this type of development. The MCC project will last for eight years, cost $8 million a year and have 60 staffers, he added.

The third program, VLSI computer-aided design and computer-aided manufacturing, will last eight years, be financed at $11 million a year and require 80 staffers, according to Gannon.

He said MCC hopes to develop a system to allow design of chips with one to 10 million transistors in less than one month's time. Currently, that task would take from 18 months to two years to complete, Gannon maintained.

The final project, the VLSI systems packaging and interconnection program, will try to develop advanced system packaging methods for chips with 700 I/O connections, each with power dissipation of 10W per sq in. Gannon said current technology is about 100 pins per sq in. and less than 1W per sq in. The MCC project will run for six years at $7 million a year and will involve 35 professional and support personnel.

James Martin's latest book is out

Now for the next 10 years



Martin: how to get rich

The tall gangling figure of computing writer-lecturer James Martin is to commercial data processing what J R Ewing is to the rest of Dallas: a goad (and one reputed to have a JR sized income).

And sometimes he reads like Dallas sounds. Though English, his books are written in business-technology Americanese (he has spent around 20 years there, most of them with IBM). It may sometimes be an ugly staccato language, but at least it is usually clear, and as his knowledge of computer technology and operations is encyclopaedic, his books have sold well into seven figures.

The result is that the lectures he gives on his world-wide circuit are usually packed. He tells with amusement of the one day lecture he gave in Australia where the audience was so large that they had to use the Sydney Opera House.

All this means that in conventional computing circles, a new work from Martin is an eagerly awaited event – and not least by some Japanese and Taiwanese publishers who like to produce pirate editions.

*An Information Systems Manifesto** is not so much a book as a well structured and sustained onslaught (It is entitled "A Report". You can charge more for reports than for books).

The onslaught is on the (claimed) crisis in DP operations, which comes from the widespread use of obsolete methodologies and techniques to generate systems which will then run on the latest hardware, systems which then do not do what management expects if, by the time they are up and running, management has not forgotten what it originally asked for and expected.

His contention is that the crisis is caused by user inabilities to get what they want up and running when they want it. In most well managed corporations the demand for new applications is rising faster than DP can supply them.

The imbalance between demand and supply is becoming worse, and applications backlogs are growing. Two to four years is the norm, though he quotes one American bank executive as saying that the bank's backlog was seven years.

But this is the documented backlog and only reveals part of the story. There is also an invisible backlog as users, knowing they are not going to have their applications up in any reasonable time scale, cease to demand them.

And that invisible backlog is often larger than the one that has been documented. Thus a recent US study sought to measure the invisible backlog in typical Fortune 500 corporations, and concluded that among those studied it averaged 168 per cent. If the bank was one of them, it would put its true backlog at 19 years.

The backlog is not simply about more of the same. Applications break down into four groups. There are the routine monitoring standard-report applications, the backbone of traditional DP; exception reporting about predefined exception conditions; enquiry systems which enable users to change reports as and when they wish; and analysis systems to support decision making.

If one is to consider them in terms of what commercial DP installations do, we find that there are more of the first than the second, more of the second than of the third, and more of the third than of the fourth, with probably a difference between one and four of – at least – one order of magnitude.

But what do managements want? Same study: six times as many analysis systems (group four), three times as many enquiry (group three) and twice as many exception (group two) systems as are currently being installed.

How are these to be obtained? Martin's case is that they are not going to happen by relying on a centralized DP applications programming department, hand programming methods, standard languages such as COBOL, and standard methodologies – or the lack of them, the very methods which are leading to the ever increasing backlog.

Structured programming may help, but not enough. The real route lies in the use of techniques about which most non DP managements are not yet aware. As he puts it in his half page summary "Manifesto for Senior Management".

"Understand that a revolution is taking place in DP, but that many DP departments are not moving fast enough to the higher productivity techniques."

He is not talking about flooding the organization with micros. Among the techniques and methodologies he describes and discusses are programmerless applications-programming languages which with their near plain language characteristics can make it easy for users to write their own applications, and the information centre concept, a tool of managerial control.

Then there are techniques for data management, for much corporate data is often not as well organized as it could be. You can ask the question, but you cannot get the answer. And of course prototyping, trying it out before you build the entire software system.

Martin's last section deals with the technology of the next ten years. It is very different. Its preoccupation is with how to get rich.

He writes about those who have already become rich fro n computing related technologies getting together and discussing those who have also "made it" in terms made popular by the film *10*, except that the numbers, exponents of ten, deal with wealth.

"There are many thousand 6's, several hundred 7's, a healthy handful of 8's, and at least one 9."

The best information available is that Martin is among the sevens. So how can one join him and them? He gives a long list of likely or necessary changes in the technology and its application, almost a list of opportunities to make money, even if of course here in polite society it should be referred to as "generating wealth".

Martin's last non specialist book *The Wired Nation* was on the famous list of books that Sir Keith Joseph recommended senior civil servants should read. (The *New Statesman* in one of my favourite misprints called it "The Wild Nation").

I do not know whether Sir Keith will like this one, but Mrs Thatcher certainly would. On the more normal scale of 10, I suspect she would probably give it an eight or a nine.

Rex Malik

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Safeguard Business Systems, Inc. has reported net sales for the first six months of 1983 of $78 million and net earnings of $4.9 million, increases of 15% and 27%, respectively, over the same period a year ago.

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Pansophic Systems, Inc. has reported revenues for the first quarter ended July 31, 1983 of $10.6 million, up 24% from the same period a year ago. Income before taxes rose 28% to $1.7 million, and earnings per share rose from 9 cents to 12 cents for the quarter.

$$$

M/A-Com, Inc. has reported income for the third quarter ended July 2 of $8.3 million or 20 cents per share, down from $10.3 million or 26 cents per share, for the third quarter last year.

Qantel Retrial Denied, CSE Award Confirmed

BOSTON — A U.S. District Court judge has denied a request for a retrial, ordering Qantel Corp. to pay $4.9 million in damages and legal fees to Computer Systems Engineering, Inc. (CSE), a Burlington, Mass.-based systems distributor.

In issuing the Aug. 30 memorandum and order, Judge Robert Keeton reaffirmed a July 8 opinion granting CSE double damages totaling more than $2.3 million, plus an additional $267,000 in legal fees. In the recent court document, Keeton made what he termed additional findings of fact "in support of my award of double damages." That July opinion also set aside a $15 million punitive damage award against Qantel and its parent company, Mohawk Data Sciences Corp.

The award and denial of Qantel's motion for a retrial harken back to an agreement between the two companies in 1976, when CSE began distributing Qantel's minicomputer line with the Solutions software package.

Keeton's strongly worded memorandum lashed out at Qantel for its alleged "reckless disregard for the truth in making false representations to CSE to induce CSE to enter into the distributorship agreement . . ."

CSE, Keeton said, attempted to improve Solutions for end users, but "was hampered by lack of explanatory documentation necessary for independent modification."

Qantel has until the end of the September to respond to the memorandum and order. The company's local counsel, Thomas Dignan, declined to discuss whether Qantel would appeal, and a spokesman for the company could not be reached at press time. CSE's counsel, Thomas Christo of North Hampton, N.H., could not be reached for comment.

IRD Study Examines Finance Mart

NORWALK, Conn. — The $1.3 billion market for online financial information is undergoing a "drastic transformation," where "the technologies designed to serve a market might end up making that market nonexistent," according to Ken Bosomworth, president of International Resources Development, Inc. (IRD).

A recent IRD study, "Financial Information Services — On-Line Teledelivery," points to both the personal computer and the management workstation as the primary catalysts leading to widespread changes in the financial information services market.

One reason why microcomputers are displacing terminals is that they are already on many users' desks. The report estimates that in the financial community alone, there are 200,000 to 300,000 micros in use. Moreover, micros are general production models, meaning that information vendors can get their hands on them whenever and in whatever quantity they are needed, avoiding the backlog and inventory snafus that have "too often plagued them" in a custom terminal environment, the report said.

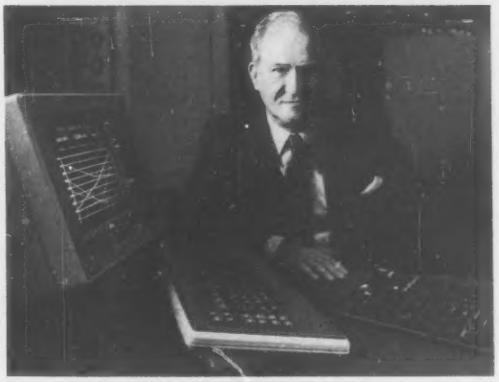
But the main reason that microcomputers have the edge is simply that they can do so much more than terminals, the study continued. Although the report found micros to be a "great improvement over the terminal," it said that the "next generation" terminal on the horizon, the executive workstation, will be to the microcomputer what the microcomputer was to the terminal.

Further, IRD predicted Apple Computer, Inc.'s Lisa, which it terms the first executive workstation, will come to be viewed as rudimentary compared with other executive workstations that will enter the market over the next five years.

These workstations will have voice recognition and synthesis capabilities and will incorporate knowledge-based systems.

The report costs $1,285 from IRD, located at 30 High St., Norwalk, Conn. 06851.

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Dr. W. LEE SHEVEL
Senior Vice President, Corporate Operations, Burroughs Corporation

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Romac & Associates/Personnel Consultants (Agency) specializes in the placement of Data Processing, Accounting, Banking and Financial Personnel. All Fees are paid by our client companies. Below are representative opportunities. Qualified candidates are invited to call or write for appointment. NO RESUME NEEDED. Replies held in confidence.

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Must have 3 years minimum experience in Image Processing and graphics software development using **RAMTEK 9460 Image Processor.** Experience with VAX 11/780 or 750 with VMS Operating System using FORTRAN 77, especially for satellite image processing application.

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You should have a BS in CS, Math, EE or a related Technical discipline as well as experience with DEX VAX, Data General or Tandem Systems and any of these languages: FORTRAN 77, PASCAL, PL/1, ADA, DEC MACRO Assembly. Experience desired in several of the following areas: Real-Time Database Systems, Advanced Software Methodologies, Modeling and Simulation, Image Processing for Displays, Network Protocol Software, Real-Time Scientific Software Development and Software Documentation.

HARDWARE/SOFTWARE SYSTEMS ENGINEERS:
Requires a BS in EE, CS or related field, MS or PhD desired, and at least 5 years experience in any of the following: image processing; information processing; meterological systems; SIGINT systems; information handling & routing; storage, retrieval and display; high-speed local area network; tactical and strategic systems; artificial intelligence; analysis, simulation and modeling; minicomputer and microprocessor distributed processing systems; computer and software architecture; photogrammetry; cartography.

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To reach our goals, we're going to need a lot more great people. We've got plenty of good reasons why you should be one of them. And we've prepared this cover letter so you can find out about opportunities at Computervision without having to waste even one day updating your resume. Just complete our letter, attach your resume, mail it to the appropriate address, and we'll tell you how our plans can fit into your future.

Sept. 26, 1983

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My salary expectation is _____. Please call me at ( ) _____ - _____ day ( ) _____ - _____ evening.

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Sincerely,

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We are currently seeking an experienced software development professional to lead a team chartered to design and implement multiple communication links between systems. You will need at least 5 years in-depth experience in linkage of mainframes, including knowledge of IBM systems (VM/CMS, OS, channel) and the ability to develop and architect communications products. A BSCS or equivalent, prior experience as a technical project leader, and good communications skills are essential.

Networking Project Leader

Leadership opportunity for experienced project leader with a broad communications and networking background including direct development experience on networking products (eg, DECNET, SNA, PRIMENET, etc.). Knowledge of transfer mechanisms would be a plus. A BSCS or equivalent and 5 or more years related experience required.

Programmers

We have a wide variety of needs for individuals who will be involved in the development and support of our next generation interactive products. Knowledge of DECNET, X.25, local networking ARPANET or bi-sync protocols required. 2 or more years experience, BSEE/BSCS or related degree.

Send resumes to: Dept. KMG, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Management

Manager of Communications & Networking

Lead a team of communications programmers/project leaders to develop our communication and networking products. You should have a minimum of 7 years experience of which at least 2 years are in a manager/project leader role. Focus of experience should be in the communication networking software development area. Specific networking experience essential. Knowledge of IBM systems is desirable.

Software Integration Manager

Ten or more years experience in software integration and test, at least five of which as project leader/supervisor/manager. BSCS or related degree.

Send resumes to: Dept. KMG, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Manager, Display Devices

Individual must have personal experience in operating systems or communications development of device drivers for graphics display terminals, plotters, and other peripherals. Solid knowledge of computer science and mathematics with exposure to CAD/CAM graphics. Total of 6-10 years hands-on experience with 2-3 years in management.

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Database Systems

Members of Technical Staff

Eight plus years experience with large scale system design with at least 5 years experience in an IBM environment. A knowledge of database management systems (relational), VM/CMS and CAD/CAM desired. Good communications skills and the ability to lead a development project required. BSCS or MSCS or equivalent.

Systems Analysts

Analyze engineering or manufacturing problems and translate into system design. Previous experience as a systems analyst in a manufacturing environment required. Must have participated as a member of a design team. Knowledge of structured analysis methodology required. BSCS or equivalent, 3 or more years experience including VM/CMS.

Systems Programmers

Install and maintain software under VM. BSCS or equivalent and two or more years experience in an IBM environment under VM.

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Software Systems Design & Quality Assurance

Communication Testers

Design software tests and automated test tools to evaluate internal operating system consistency. Experience with 16 or 32-bit microprocessor. Familiarity with 68000 and UNIX. Knowledge of Fortran 77 and "C". Additional experience on 3780, 2780, SNA, HASP, or X.25. 2-4 years system software experience with BSCS Math or Physics.

Systems Product Testers

Design diagnostic test package for hardware systems function. Detect Rev level firmware needs. Package to be used as operating systems test. Requires 1-3 years experience, BSEE or CS with hardware knowledge, and familiarity with 16 or 32-bit microprocessors, and disk, tape and terminal hardware interface.

Integration Specialists

Experience with Fortran, Assembler and "C" programming. Individual to work in a technical environment with Beta Site support responsibility. Field service or some customer exposure. Requires strong interpersonal skills. BSCS preferred.

Send resumes to: Dept. PK, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Software Engineering

Operating Systems Project Leader

Immediate need for an individual to head team in the development of next generation operating systems. Requires solid background in OS design/development and excellent people and project management skills.

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Applications programmers with some operating systems exposure for development of screen editors, converters, and other software productivity tools. Strong group skills and ability to interface with programming community required.

Solids Modeling

MS or PhD math or applied math and broad software experience from systems to application programming. Will develop modules for solid and geometric modeling.

UNIX Systems

Individual contributors with experience in development of Operating Systems. Experience with UNIX, Pascal, and "C" desirable.

Compilers/Languages

Development of family of 5 portable compilers, and interactive source level symbolic debugger, a portable linker and optimized code generator. Implementation language is a proprietary block structure language of the same family as Pascal or ALGOL 60 and was designed to support development of portable operating systems. Development is done exclusively in high level languages.

Graphics Software

Key position for an individual with 5 or more years experience in graphics software development. Must have expertise with graphics algorithms such as hidden line/surface removal, shading and microprocessor-assisted graphics functions for CAD/CAM applications. BSCS or equivalent, MS desirable.

Send resumes to: Dept. RWB, Computervision Corporation, 14 Crosby Drive, Bldg. 14-3, Bedford, MA 01730.

Programmers

Positions exist at all levels for individuals with a thorough knowledge of Fortran, Assembler, "C", or other high level language. Demonstrated ability in software or testing design. Some experience with compilers or graphics processors desirable. Requires a BS or MS in Math, CS, Physics or related field.

Technical Trainer

Technical ability in CS and Math. Strong interpersonal and teaching skills. Management experience in developing a technical training program for R&D environment. Course will include new hire training and other course developments as the need arises. 5+ years of experience in technical software environment. Must have expertise in Fortran.

Send resumes to: Dept. PK, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Diagnostics

Diagnostic Engineering Software Department

Diagnostic Operating System design and implementation of diagnostic program/systems for a Diagnostic Executive used for a new generation of CAD/CAM systems. Familiarity with real-time operating systems, disk file systems, and user friendly interfaces is a plus. 68K microprocessor, Assembly language programming, "C", UNIX. BSEE/BSCS and 3-7 years.

Network Diagnostics

You will have the responsibility for the current and future on-line network diagnostics. Involves interfacing with the operating systems and communications software groups. Familiarity with Ethernet, DECNET, Fortran, and Pascal is helpful. 2-5 years experience with BSEE.

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Develop microdiagnostics for state-of-the-art hardware. Requires background in both Computer Engineering and Diagnostic Programming. 2-5 years experience with BSEE.

Module Diagnostics

Develop diagnostics in Assembly or "C" language for the functional verification of I/O hardware for communications, graphics and mass storage. Knowledge of I/O subsystems required. 2-4 years experience with BSEE/BSCS.

Send resumes to: Dept. JBS, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

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We require at least 4 years' systems analysis/systems engineering experience in either IBM mainframe, SNA 3270 and/or 2780/3780. A BS in computer science, math or a related technical field, as well as outstanding verbal and written skills and the willingness to travel approximately 30-40% is necessary.

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APL

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SYSTEMS ANALYST

Leasing Systems

San Francisco Bay Area

Our rapidly growing financial services corporation is recruiting a Systems Analyst to participate in the design, development and installation of a new lease administration system.

Prerequisites for the position include:

- Demonstrated ability in the design, development and implementation of large-scale financial computer system projects.
- Ability to interact and communicate effectively with all levels of staff and management.
- Minimum 5 years data processing experience preferred.
- Leasing application experience using DEC VAX systems preferable.
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The successful candidate will be responsible for system performance, installation of software releases, installation of new devices, analysis and resolution of system problems. This individual will utilize two (2) 2 Meg H.P. 1000 systems.

The following skills are required:

- A minimum of 3-5 years total D.P. experience
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- Knowledge of RJE-6, DS1000, and Data communication

Experience listed below would be considered a plus:

- Manufacturing environment
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- IBM 8100 and/or IBM S/38 system programming
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SYSTEM 38

RPG III, CL

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All fees, interview and relocation costs paid by client company. Send confidential letter or resume to: Sheehy Associates, Inc., Suite M, 465 Congress St., Portland, Maine 04101.

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COMMUNICATIONS SYSTEMS PROGRAMMER

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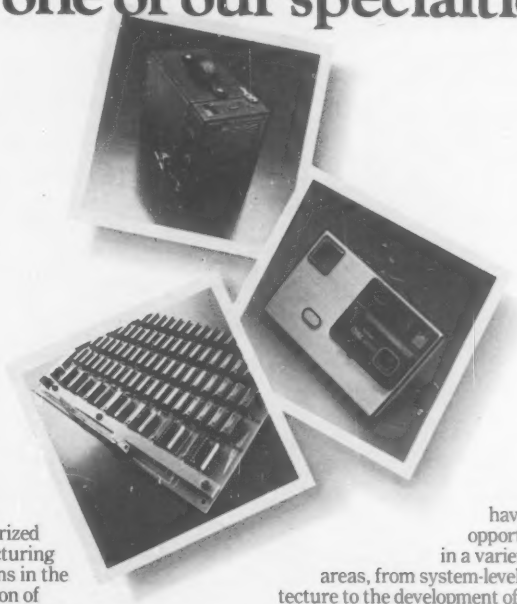
This position will be responsible for the generation and maintenance of communications systems software. Prefer candidates with experience in CICS/VS, VTAM, NCP, Tandem Nonstop II and Assembler.

Salaries commensurate with experience, comprehensive benefits. Submit resume and salary requirements to: **Employment Officer, P.O. Box 1344, Albuquerque, NM 87103.**

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We are seeking an individual to supervise our DBA function. Responsibilities include logical and physical design, recovery/restart procedures, data base implementation and maintenance, plus development of standards in new systems.

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College degree or equivalent experience in an area or discipline related to administrative data processing. Should have experience in computer programming and/or analytical work. Preference given to applicants with work experience in higher education or in large scale computer systems. Applications accepted through October 10, 1983 or until suitable candidates are found. Send resume and references to:

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Data Processing

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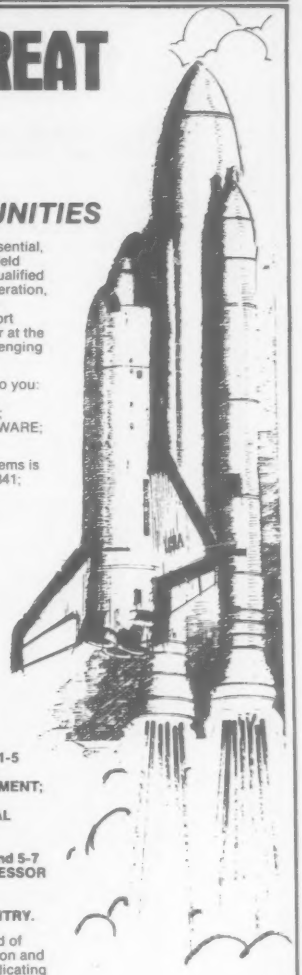
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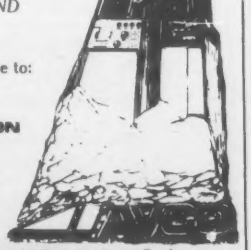
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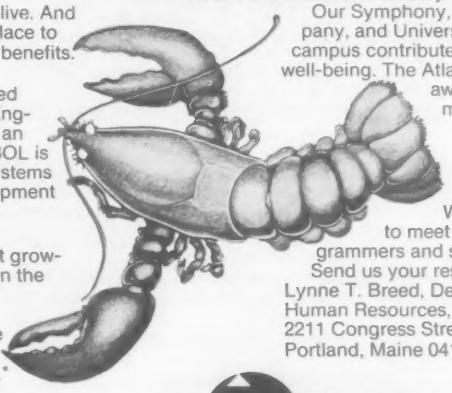
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DATA PROCESSING

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To plan, supervise and participate in all systems development efforts in the ministry, from functional specifications through the operational phase. Requires extensive experience with IBM Mainframes (8 years minimum), Data Base (Adabas/Natural), Structured Techniques, and On-Line Systems. Candidates should hold an advanced degree in Computer Science/Information System, have at least 3 years of supervisory experience and the ability to liaison well with management, users and staff.

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BS in Computer Science required. Must have 5-8 years experience in Data Processing and a proven track record in Business Applications Development, with at least 3 years as a data base administrator in Adabas/Natural Environments. Expertise in Cobol and/or PL/1. OS/VSI or higher level experience. Must be able to liaison well with management, staff and users.

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BS/BA required. Must have 4-6 years experience in Data Processing and a proven track record in all of the following areas: requirement analysis for major business applications, project responsibilities and users, Cobol and/or PL/1 expertise, OS/VSI or higher level experience, data base knowledge. Understanding of S/W development methodologies is preferred. Modelling experience is a definite plus.

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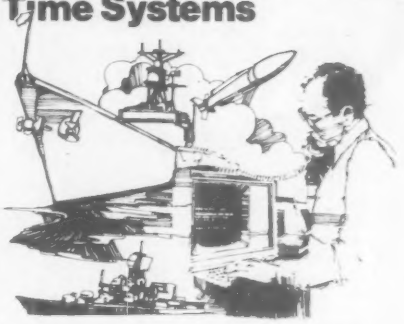
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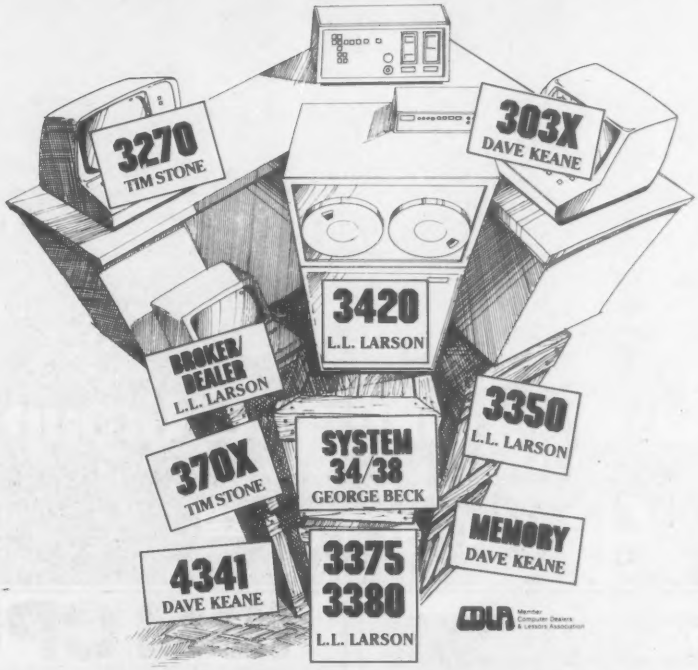
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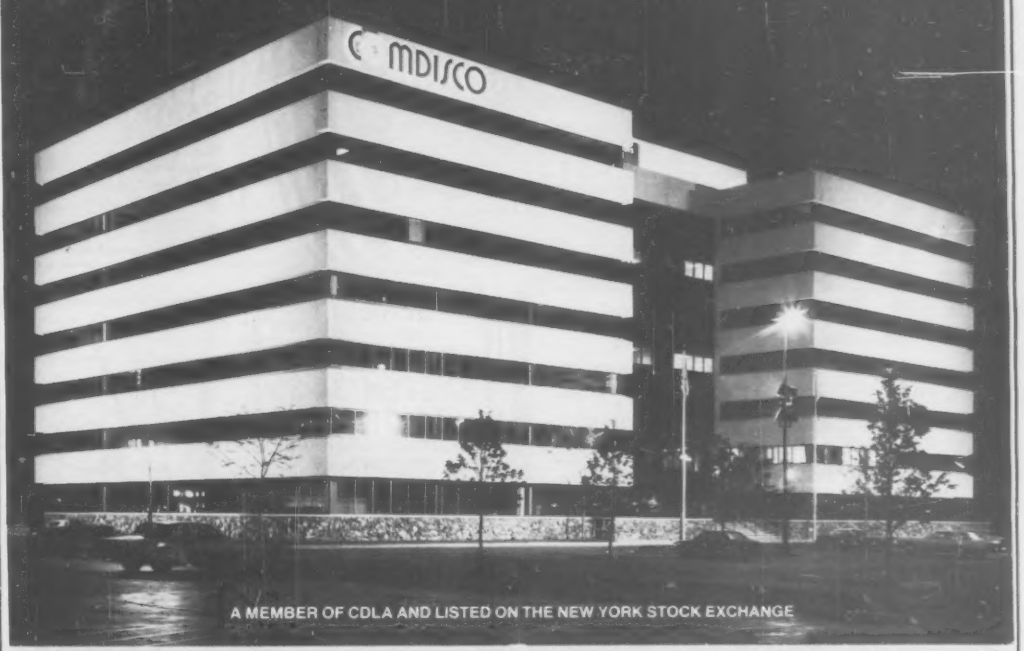
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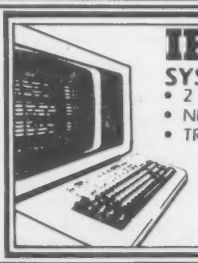
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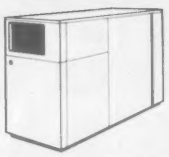
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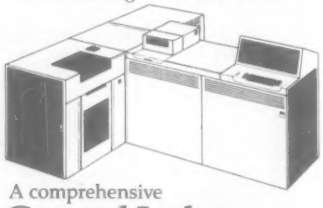
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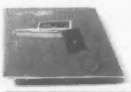
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Accounts Receivable improves bookkeeping efficiency and reduces administrative tasks. This system is available in either open item or balance forward methods. For both methods, the system has cycle billing capability and allows printing of all statements on file or statements for specific customers. You can obtain up-to-date status of customer records, including current balance, aging and credit checking. Available for $1,000 on the System/34 and $1,200 on the System/36.

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The Inventory System gives your company complete control over inventory, both on hand and on order. The system provides reports to let you know the status of every item at any time. You can determine inventory costs based on four methods: LIFO, FIFO, average cost and replacement cost. Available for $1,000 on the System/34 and $1,200 on the System/36.

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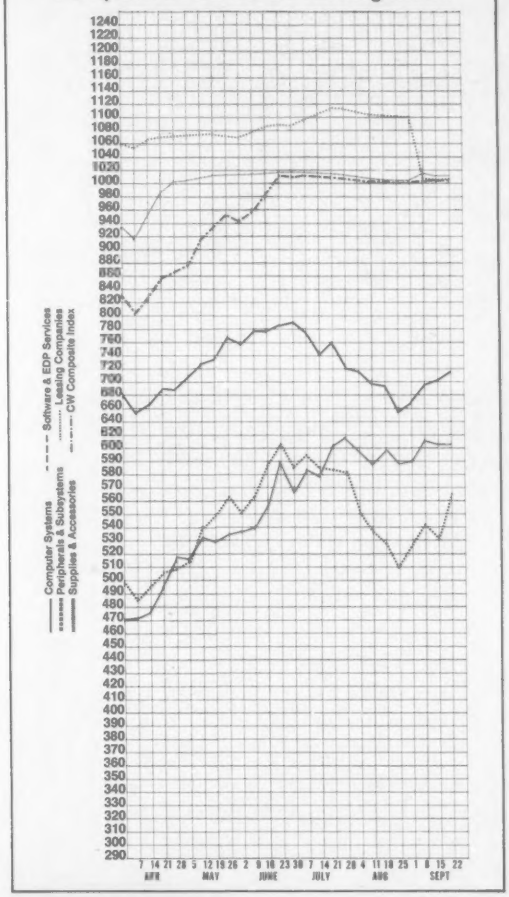
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Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, SEPTEMBER 21, 1983

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		1982-83 RANGE (1)	CLOSE SEP 21 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	12- 24	18	-1 1/4	-7.2
O	ALTOS COMPUTER SYST	11- 28	11 1/4	-1 1/2	-11.7
A	AMDAHL CORP	8- 30	18 7/8	+1 3/8	+7.8
O	APPLE COMPUTER INC	27- 83	31 1/2	- 1/8	-0.3
N	AT&T	60- 70	67 1/2	+1 1/8	+1.6
N	BURROUGHS CORP	28- 58	55	+1 1/2	+2.8
O	COMPUTER AUTOMATION	7- 17	11 1/4	+ 1/4	+2.2
A	COMPUTER CONSOLES	6- 26	20 5/8	- 5/8	-2.8
N	CONTROL DATA CORP	21- 82	51	-1 3/4	-3.3
O	CONVERGENT TECHNOL	25- 41	25 3/8	+1 1/8	+4.8
N	CRAY RESEARCH INC	20- 52	44 7/8	+3 5/8	+8.7
N	DATA GENERAL CORP	20- 74	74 3/8	+7 5/8	+11.4
N	DATAPOINT CORP	11- 38	25 3/8	+2	+8.5
N	DIGITAL EQUIPMENT	62-132	108 1/4	+7 1/8	+7.1
A	ECCO INC	8- 18	15 1/4	+ 1/8	+0.8
N	ELECTRONIC ASSOC.	5- 15	13 1/4	- 3/8	-2.7
N	FLOATING POINT SYST	18- 44	34	+ 7/8	+2.8
N	FOXBORO	22- 47	33 3/4	+ 1/2	+1.5
O	GENERAL AUTOMATION	3- 18	12	+1	+9.0
N	GOULD INC	31- 44	34	-2 5/8	-7.1
N	HARRIS CORP	20- 51	37 1/4	+ 1/2	+1.3
N	HEWITT-PACKARD CO	22- 48	45 1/4	+2 1/4	+5.2
N	HONEYWELL INC	60-123	122 1/8	+4	+3.3
N	IBM	57-126	123	+ 1/8	+0.1
O	IPL SYSTEMS INC	5- 14	8 3/4	-1	-10.2
N	LANIER BUSINESS PROD	12- 21	18 1/8	+ 3/8	+2.0
N	M/A-COM INC	22- 35	28 1/4	+ 3/4	+2.7
O	MAGNUSON COMP SYSTS	2- 5	7/8	0	0.0
N	MANAGEMENT ASSIST	7- 18	10 7/8	+ 1/4	+2.3
N	MATSUSHITA ELEC(ADR)	47- 74	68 1/2	+1 5/8	+2.4
N	MODULAR COMPUTER SYS	6- 18	14 1/4	+1 1/4	+9.6
N	MOHAWK DATA SCI	10- 18	13 3/8	+ 1/2	+3.8
N	MOTOROLA INC	82-148	138 1/2	+3 1/4	+2.4
N	NAT'L SEMICONDUCTOR	22- 80	54 7/8	+4 3/8	+8.6
N	NCR	38-128	123 7/8	+3 3/4	+3.1
N	PERKIN-ELMER	17- 37	36	+ 1/8	+0.3
N	PRIME COMPUTER INC	11- 30	18 1/2	+1 5/8	+10.8
N	SPERRY CORP	21- 46	45 5/8	+2	+4.5
O	TANDEM COMPUTERS INC	14- 36	35 7/8	+3 3/8	+10.3
N	TANDY CORP	37- 85	83 5/8	+2 5/8	+3.4
O	TELEVIDEO SYSTEMS	18- 41	18 1/2	-3 1/4	-14.8
N	TEXAS INSTRUMENTS	71-178	116 3/4	-2 7/8	-2.4
O	VECTOR GRAPHICS INC	4- 14	6 1/4	- 1/8	-2.0
A	WANG LABS "B"	13- 42	34 1/2	+3 1/4	+10.3
A	WANG LABS "C"	11- 42	34 1/8	+3 3/8	+10.9
N	XEROX CORP	35- 50	44	0	0.0

LEASING COMPANIES

O	BOOTHE FINANCIAL CP	11- 30	28	0	0.0
N	COMDISCO INC	7- 42	38 7/8	+1 1/2	+3.8
O	CONTINENTAL INFO SYS	3- 16	13 1/4	-1	-7.0
N	DPF INC	5- 14	13	- 5/8	-4.5
N	U.S. LEASING	18- 47	41 1/2	+3	+7.7

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E X C H		1982-83 RANGE (1)	CLOSE SEP 21 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 8	4 3/4	- 1/4	-5.0
O	ADVANCED SYSTEMS INC	8- 22	17 3/4	- 1/4	-1.4
O	AGS COMPUTERS INC	7- 32	27 1/2	+1 3/4	+6.7
O	AMERICAN SOFTWARE	21- 31	28	+2 3/8	+9.2
N	ANACOMP INC	8- 23	9 1/4	-2 3/4	-22.9
O	ANALYSTS INTL CORP	5- 20	12	-1	-7.6
A	APPLIED DATA RES.	8- 37	30	+1 3/4	+6.1
O	ASK COMPUTER SYSTEMS	8- 21	20 1/4	+ 1/2	+2.4
B	ASTRADYNE COMP IND	1- 7	3 3/4	- 1/4	-6.2
N	AUTOMATIC DATA PROC	21- 44	37 1/2	- 1/2	-1.3
O	CGA COMPUTER ASSOC	5- 15	14 1/4	+ 1/2	+3.6
O	COMPUTER ASSOC INT'L	8- 35	31 3/4	0	0.0
O	COMPUTER HORIZONS	8- 20	12	- 3/4	-5.8
O	COMPUTER NETWORK	4- 10	7 1/2	+ 1/8	+1.6
N	COMPUTER SCIENCES	11- 23	16 7/8	- 7/8	-4.9
O	COMPUTER TASK GROUP	8- 22	15 1/2	- 1/4	-1.5
O	COMPUTER USAGE	2- 22	12 1/2	- 1/4	-1.9
O	COMPUTONE SYSTEMS	8- 38	9	- 1/4	-2.7
O	COMSERV CORP	7- 20	8 3/4	+1 1/2	+20.6
O	CONSHARE	7- 13	11 1/8	- 3/4	-6.3
N	CULLINET SOFTWARE	12- 50	47 3/8	+4 1/2	+10.4
O	CYCARE SYSTEMS INC	8- 27	20	- 1/2	-2.4
N	ELECTRONIC DATA SYST	10- 42	36 1/4	- 1/4	-0.6
O	HOGAN SYSTEM INC	27- 53	50 1/4	+2	+4.1
N	GENERAL ELECTRIC CO	45- 58	50 1/8	+ 1/8	+0.2
N	GTE CORP	38- 48	43 3/4	+1 1/2	+3.5
N	INFORMATICS INC	10- 34	26 1/8	+ 7/8	+3.4
O	INFOTRON SYSTEMS COR	23- 43	37	+2 1/2	+7.2
O	KEANE ASSOCIATES	4- 15	10 1/4	0	0.0
A	LOGICON	8- 30	28 1/8	+ 3/8	+1.3
O	MCI COMMUNICATIONS	15- 34	17 1/4	+1	+6.1
O	MNGT SCI AMER INC	8- 33	29 3/4	+ 3/4	+2.5
O	MATHEMATICAL APP GRP	12- 22	14 1/2	- 1/2	-3.3
O	MICOM SYSTEMS INC	25- 50	48 1/2	+3 1/2	+8.1
O	MONCHIK-MEBER CP	10- 22	12 1/2	+1 1/4	+11.1
O	NATIONAL DATA CORP	5- 26	18 1/8	+ 5/8	+3.5
O	ON-LINE SOFTWARE INT	19- 27	23 1/2	0	0.0
O	PANSOPHIC SYSTEMS	8- 30	25 7/8	+ 3/8	+1.4
N	PLANNING RESEARCH	8- 21	15 1/2	- 1/8	-0.7
O	POLICY MGMT SYSTS CP	36- 68	61 3/4	+1 5/8	+2.7
O	PROGRAMMING & SYS	1- 7	7 1/8	+ 3/8	+5.5
O	REYNOLDS & REYNOLD	17- 53	47 3/4	- 1/4	-0.5
O	SEI CORP	11- 34	32 3/4	+3 3/4	+12.9
O	SHARED MEDICAL SYST	13- 43	40 7/8	+2 1/2	+6.5
O	SCIENTIFIC COMPUTERS	8- 14	12 1/4	- 1/2	-3.9
O	SOFTWARE AG	5- 17	11 1/8	+1 3/8	+14.1
N	TYMSHARE INC	12- 30	21 3/4	+4 1/2	+17.1
A	UBS CORP	5- 18	14	- 1/8	-0.8
N	WYLY CORP	7- 17	12 1/4	- 3/4	-5.7

COMPONENTS

N	ADVANCED MICRO DEV	13- 35	31 1/2	+2 3/4	+8.5
O	ADV'D SEMICONDUCTOR	12- 34	31 1/4	+2 1/4	+7.7
N	ANALOG DEVICES INC	18- 42	41 1/4	+ 5/8	+1.5
O	ANALOGIC CORP	23- 27	26 3/4	+2 1/4	+9.1
N	APPLIED MAGNETICS CP	18- 37	31 5/8	- 1/8	-0.3
N	TERADYNE	14- 38	33	+1 1/2	+4.7

PERIPHERALS & SUBSYSTEMS

P	AM INTERNATIONAL	2- 7	6	+ 3/8	+6.6
A	ANDERSON JACOBSON	8- 26	12 1/2	-1 1/4	-9.0
O	AUTO-TROL TECHNOLOGY	8- 29	23 5/8	+1 5/8	+7.3
O	BANCTEC INC	7- 33	18 1/4	- 1/4	-1.5
A	BEEHIVE INT'L	4- 15	10 7/8	- 3/8	-3.3
A	BOLT,BERANEK & NEW	9- 60	57 1/4	+7 1/4	+14.5
O	CAMBEX CORP	2- 4	2 3/8	- 1/4	-9.5
N	CENTRONICS DATA COMP	8- 28	26 5/8	+1 3/8	+5.4
A	CETEC CORP	4- 12	10	- 1/2	-4.7
O	COGNITRONICS	2- 20	11 1/8	- 1/8	-1.1

COMPUTER DEVICES & SUPPLIES

E X C H		1982-83 RANGE (1)	CLOSE SEP 21 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER DEVICES INC	3- 21	3 1/2	-1	-22.2
O	COMPUTER TRANSCEIVER	4- 12	6 3/8	- 1/8	-1.9
N	COMPUTERVISION CORP	15- 53	51 3/4	+3 1/8	+6.4
N	CONRAC CORP	17- 38	18 3/8	+ 1/8	+0.6
A	DATAPRODUCTS CORP	15- 41	28	+1 1/2	+5.6
A	DATARAM CORP	5- 12	11 1/4	- 1/2	-4.2
O	DATA SWITCH CORP	13- 41	35	+2 7/8	+8.9
O	DATUM INC	2- 17	12 3/4	+1 1/8	+9.6
O	DECISION DATA COMPUT	3- 16	12 3/8	+ 1/4	+2.0
O	DOCUTEL-OLIVETTI	18- 39	22 7/8	+1 3/8	+6.3
N	ELECTRONIC M & M	5- 11	8 5/8	+ 3/8	+4.5
O	EVANS & SUTHERLAND	18- 50	45 1/2	+1	+2.2
O	GANDALF TECHNOLOGIES	9- 22	9 7/8	- 1/4	-2.4
N	GEN'L DATA COMM IND	6- 28	28 1/8	+ 3/8	+1.3
O	GREAT SOUTHWEST IND	2- 6	1 3/4	0	0.0
N	HAZELTINE CORP	7- 31	26	+2 3/8	+10.0
O	ICOT CORP	3- 10	5 3/8	- 1/2	-8.5
O	INFORMATION INTL INC	10- 22	17	- 1/2	-2.8
O	INTEL CORP	11- 45	43 3/4	+2 1/2	+8.0
O	IPL SYSTEMS INC	5- 14	8 3/4	-1	-10.2
A	LUNDY ELECTRONICS	7- 19	12 7/8	- 1/2	-3.7
O	MEGADATA CORP	9- 15	12 3/4	+1 3/4	+15.9
A	MSI DATA CORP	16- 37	16 1/2	-1 1/4	-7.0
N	NASHUA CORP	9- 28	26	+ 3/8	+1.4
O	NETWORK SYSTEMS CORP	8- 34	25 3/4	+2 1/2	+10.7
N	NO AMERICAN PHILIPS	47- 73	72 1/4	+2 3/4	+3.9
N	NORTHERN TELECOM LTD	22- 47	46 1/2	+1 3/4	+3.9
O	OMEX	3- 6	6	0	0.0
N	PARADYNE CORP	14- 30	20 3/8	- 1/8	-0.6
A	PENRIL CORP	7- 14	11	0	0.0
O	PHOENIX AMERICAN INC	7- 17	14 1/4	+ 1/4	+2.0
N	PLESSEY CO (ADR)	26- 41	31 3/4	+1 3/8	+4.5
O	PRINTRONIX INC	24- 34	25	-2	-7.4
O	RAMTEK CORP	12- 28	15 1/4	-1 3/4	-10.2
N	RAYTHEON CO	42- 58	47 7/8	- 1/4	-1.5
N	RECOGNITION EQUIP	4- 17	15	+ 1/4	+1.6
N	ROLM CORP	40- 80	64 5/8	+ 3/8	+0.5
N	SANDERS ASSOCIATES	90-119	118 1/2	+3 1/2	+7.7
O	SCAN DATA	1- 3	1 1/2	0	0.0
O	SCAN-TRON CORP	12- 16	13 1/4	0	0.0
N	SCIENTIFIC ATLANTA	15- 23	17 1/2	- 1/8	-0.7
N	STORAGE TECHNOLOGY	16- 33	20 5/8	+1 7/8	+10.0
O	SYKES DATATRONICS	8- 27	8 1/2	+ 3/8	+4.1
O	SYSTEMS & COMP TECH	27- 39	34	+ 3/4	+2.2
A	T BAR INC	7- 17	10 1/4	- 1/2	-4.6
A	TAB PRODUCTS CO	8- 30	24 3/8	-2	-7.5
O	TANDON CORP	18- 38	30 1/4	+1 1/2	+5.2
A	TEC INC	6- 12	8 5/8	- 3/4	-10.1
N	TEKTRONIX INC	34- 87	82 1/8	+3 1/2	+4.4
N	TELEX	5- 32	27 3/8	+ 1/2	+1.8
O	TESDATA SYSTEMS CP	3- 17	12 3/8	-1	-7.4
N	TIMEPLEX INC	7- 28	24	+2 5/8	+12.2
O	VISUAL TECHNOLOGY	9- 26	18 3/4	- 1/4	-1.2

SUPPLIES & ACCESSORIES

N	AMERICAN BUS PRODS	11- 33	32 1/4	- 1/8	-0.3
N	BARRY WRIGHT	13- 31	30 1/2	+1	+3.3
A	DUPLEX PRODUCTS INC	12- 26	23 5/8	+ 3/4	+3.2
N	ENNIS BUS. FORMS	6- 25	22 1/2	- 1/8	-0.5
N	3M COMPANY	48- 90	80 5/8	+1 5/8	+2.0
N	MOORE CORP LTD	28- 71	48 1/2	+2 1/2	+5.4
O	STANDARD REGISTER	11- 34	31	+1 1/2	+5.0
N	WALLACE BUS FORMS	11- 30	28 3/4	- 1/8	-0.4

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